



United States
Department of
Agriculture



Natural
Resources
Conservation
Service

In cooperation with
Texas Agricultural
Experiment Station and
United States Forest
Service

Soil Survey of Shelby County, Texas



How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

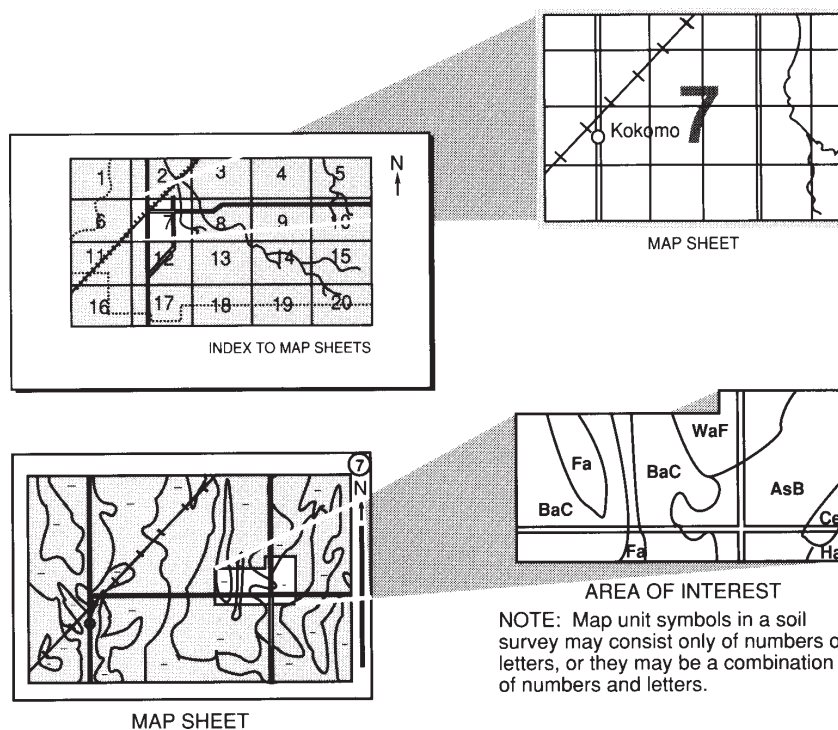
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2002. Soil names and descriptions were approved in 2002. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2002. This survey was made cooperatively by the Natural Resources Conservation Service, the Texas Agricultural Experiment Station, and the United States Forest Service. The survey is part of the technical assistance furnished to the Shelby Soil and Water Conservation District. Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: Lake Pinkston.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at <http://www.nrcs.usda.gov>.

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Issued 2006

Foreword

This soil survey contains information that affects land use planning in Shelby County. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Texas Cooperative Extension.

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Soil Survey of Shelby County, Texas

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United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
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SHELBY COUNTY is in the northeastern part of east Texas (fig. 1). It is bordered to the east by the Toledo Bend Reservoir, which adjoins Louisiana; to the north by Panola County; to the south by San Augustine and Sabine Counties; and to the west by Nacogdoches and Rusk Counties.

The county has a total of 534,176 acres, consisting of 506,570 acres of land and 27,606 acres of water. Elevation ranges from 160 to 630 feet above sea level.

Shelby County is in the East Texas Timberland Resource Area. The main soils formed under forest vegetation in a humid environment. Most soils are light colored and low in natural fertility. The land surface ranges from nearly level to very steep. The nearly level areas are mainly flood plains of major streams. The entire county has a dendritic drainage system with many large streams.

General Nature of the County

This section gives general information about Shelby County. It describes settlement, agriculture, natural resources, agriculture, and climate.

Settlement

Shelby County was organized in 1837 and named for Issac Shelby, an officer in the Continental Army during the Revolutionary War. The earliest settlement in the county was in East Hamilton, which was settled on the Sabine River. East Hamilton boasted the first church, school, and post office. Other settlements were Buena Vista, Shelbyville, and Patroon. Shelbyville was the first county seat. As time went on and the railroads were constructed, Center, Tenaha, Timpson, and Joaquin became the leading communities.

Center, the present county seat, was established in 1866 when a law was passed requiring that all county seats be located in the center of the county. R.L. Parker, who was county clerk and also a surveyor, realized that Shelbyville was not the center of the county. He went before the commissioners court and asked that the spot where he had driven his survey stake be declared the central spot. They refused, but several weeks later the people in the northern and western portions of the county held an election and voted to move the county seat.

Soil Survey of Shelby County, Texas



Figure 1.—Location of Shelby County in Texas.

Natural Resources and Agriculture

At the turn of the last century, Shelby County was largely covered with virgin growth of shortleaf and loblolly pines intermingled with several species of oak and sweetgum. Sawmillers came and began to harvest the virgin pine trees. Railroads were built into the western part of the county. The Pickering Lumber Company constructed a mill at Haslam and built tram roads throughout the eastern part of the county.

Following the harvest of the timber, farmers began breaking the virgin soil to plant crops of cotton and corn. After World War I, during the 1920's, Shelby County developed a cotton economy. Cotton gins were built in almost every community. During the years 1925 and 1926, these gins ran almost day and night in September, October, and November. More than 33,000 bales of cotton were ginned in those 2 years. Almost 80,000 acres of cotton were planted from 1925 to 1933. The flood of July 1933 cut the harvest to less than 14,000 bales.

With the inauguration of the New Deal in 1933, cotton production began to fade from the basic economy of the county. Cotton was replaced by tomatoes as a cash crop by many farmers in the Timpson, Tenaha, and Joaquin areas. Watermelons, cantaloupes, and field peas were planted by landowners in the Sandhill area southeast of Center.

In the 1930's, because of the dipping of cattle and the eradication of the Texas fever tick, cattle production gained in importance.

In the spring of 1948, programs for boiler production were introduced. By 1954, the raising, feeding, processing, and trucking of broilers, live and processed, became the largest economic industries in the county.

Today, the farm population of the county is a small percentage of what it was, but the standard of living is much higher. The main source of farm income is cattle, broilers, and timber (fig. 2).

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Center, Texas, in the period 1971 to 2000. Table 2 shows probable dates of the first



Figure 2.—A beef and poultry operation in Shelby County.

freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 47 degrees F and the average daily minimum temperature is 35 degrees. The lowest temperature on record, which occurred on February 2, 1951, is 0 degrees. In summer, the average temperature is 80 degrees and the average daily maximum temperature is 92 degrees. The highest recorded temperature, which occurred on August 31, 1954, is 109 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 53 inches. Of this, 25 inches, or about 47 percent, usually falls in April through September. The growing season for most crops falls within this period.

The average seasonal snowfall is about 1.2 inches. The greatest snow depth at any one time during the period of record was 5 inches.

The average relative humidity in midafternoon is about 58 percent. Humidity is higher at night, and the average at dawn is about 87 percent. The sun shines 75 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south-southeast. Average windspeed is highest, 10 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and

miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

Soil Survey of Shelby County, Texas

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Eastwood-Maben-Meth

Map Unit Composition

Extent of the map unit in the county: 42 percent

Extent of the components in the map unit:

Eastwood soils—47 percent

Maben soils—21 percent

Meth soils—8 percent

Minor inclusions—24 percent

Minor Inclusions

- Laneville soils, which are brownish yellow loamy material over gray clayey material; on flood plains (7 percent of map unit)
- Latex soils, which have yellowish loamy upper horizons over grayish clayey lower horizons with reddish redoximorphic concentrations; on interfluves (5 percent of map unit)
- Sawtown soils, which have very fine sandy loam about 20 inches thick over yellowish loamy material over a grayish clayey subsoil; on mounds on marine and stream terraces (3 percent of map unit)
- Alazan soils, which are yellowish loamy soils with gray depletions; at the heads of drains, on toeslopes, and on intermounds on marine and stream terraces (2 percent of map unit)
- Lilbert soils, which have loamy fine sand 20 to 40 inches thick over a brownish loamy subsoil; on ridges and interfluves (2 percent of map unit)
- Dreka soils, which are grayish silty soils; on flood plains (1 percent of map unit)
- Owentown soils, which are brownish coarse-loamy soils; on natural levees on flood plains (1 percent of map unit)
- Tenaha soils, which are moderately deep soils that have loamy fine sand 20 to 40

Soil Survey of Shelby County, Texas

inches thick over a brownish subsoil over stratified sandstone and shale; on ridges and side slopes (1 percent of map unit)

- Bowie soils, which are loamy yellowish soils with plinthite; on interfluves (1 percent of map unit)
- Guyton soils, which are loamy and gray; on terraces (1 percent of map unit)

Soil Properties and Qualities

Eastwood

Major land resource area: Western Coastal Plain (133B)

Landform: Interfluve on coastal plain

Hillslope position: None

Parent material: Clayey marine deposits

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Very slow (about 0.00 in/hr)

Available water capacity: Low (about 3.6 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very high

Ecological site: Unspecified

Land capability classification (non-irrigated areas): 4e

Maben

Major land resource area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Convex

Parent material: Loamy and clayey material over shale

Slope range: 5 to 15 percent

Surface fragments: None

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 1.7 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: High

Ecological site: Unspecified

Land capability classification (non-irrigated areas): 4e

Meth

Major land resource area: Western Coastal Plain (133B)

Landform: Ridge on coastal plain

Hillslope position: None

Parent material: Loamy and clayey marine sediment

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Soil Survey of Shelby County, Texas

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Low (about 3.7 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Ecological site: Unspecified

Land capability classification (non-irrigated areas): 3e

Typical Profile

Eastwood

Surface layer:

0 to 7 inches—dark grayish brown very fine sandy loam; very strongly acid

Subsurface layer:

7 to 10 inches—brown very fine sandy loam; strongly acid

Subsoil:

10 to 19 inches—dark red clay; very strongly acid

19 to 30 inches—dark red clay; very strongly acid

30 to 40 inches—light brownish gray clay; very strongly acid

40 to 55 inches—light brownish gray clay; very strongly acid

Substratum:

55 to 67 inches—strong brown and light gray sandy clay loam; extremely acid

67 to 80 inches—yellowish red, brownish yellow, and grayish brown clay loam; extremely acid

Maben

Surface layer:

0 to 4 inches—brown fine sandy loam; strongly acid

Subsoil:

4 to 14 inches—yellowish red clay loam; very strongly acid

14 to 24 inches—yellowish red clay loam; very strongly acid

24 to 28 inches—reddish brown and yellowish brown silty clay loam; very strongly acid

Substratum:

28 to 38 inches—strong brown, light yellowish brown, yellowish brown, and light brownish gray silt loam; very strongly acid

38 to 80 inches—light brownish gray and light reddish brown weathered bedrock; very strongly acid

Meth

Surface layer:

0 to 4 inches—dark grayish brown fine sandy loam; moderately acid

Subsurface layer:

4 to 8 inches—brown fine sandy loam; moderately acid

Subsoil:

8 to 21 inches—red clay; strongly acid

21 to 30 inches—red clay; strongly acid

30 to 43 inches—red sandy clay loam; very strongly acid

43 to 54 inches—red sandy clay loam; very strongly acid

54 to 69 inches—red sandy clay loam; very strongly acid
69 to 85 inches—yellowish red fine sandy loam; very strongly acid

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

2. Metcalf-Eastwood-Latex

Map Unit Composition

Extent of the map unit in the county: 21 percent

Extent of the components in the map unit:

Metcalf soils—39 percent
Eastwood soils—34 percent
Latex soils—17 percent
Minor inclusions—10 percent

Minor Inclusions

- Laneville soils, which have brownish yellow loamy material over gray clayey material; on flood plains (7 percent of map unit)
- Owentown soils, which are brownish coarse-loamy soils; on natural levees on flood plains (2 percent of map unit)
- Mollville soils, which are grayish and loamy; in depressional areas on terraces (1 percent of map unit)

Soil Properties and Qualities

Metcalf

Major land resource area: Western Coastal Plain (133B)
Landform: Marine terrace on coastal plain
Hillslope position: None
Parent material: Loamy over clayey deposits
Slope range: 0 to 2 percent
Surface fragments: None
Depth to restrictive feature: None
Drainage class: Somewhat poorly drained
Slowest permeability: Impermeable (about 0.00 in/hr)
Available water capacity: Low (about 4.0 inches)
Shrink-swell potential: High (about 7.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 18 to 30 inches
Runoff class: High
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 2w

Eastwood

Major land resource area: Western Coastal Plain (133B)
Landform: Interfluvium on coastal plain
Hillslope position: Linear
Parent material: Clayey marine deposits
Slope range: 5 to 15 percent

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Surface fragments: None
Depth to restrictive feature: 40 to 60 inches to densic material
Drainage class: Well drained
Slowest permeability: Very slow (about 0.00 in/hr)
Available water capacity: Low (about 3.5 inches)
Shrink-swell potential: High (about 7.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: More than 6 feet
Runoff class: Very high
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 6e

Latex

Major land resource area: Western Coastal Plain (133B)
Landform: Marine terrace on coastal plain
Hillslope position: None
Parent material: Loamy over clayey sediments
Slope range: 1 to 3 percent
Surface fragments: None
Depth to restrictive feature: None
Drainage class: Moderately well drained
Slowest permeability: Slow (about 0.06 in/hr)
Available water capacity: Low (about 3.6 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 36 to 54 inches
Runoff class: Unspecified
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 2e

Typical Profile

Metcalf

Surface layer:
0 to 10 inches—brown very fine sandy loam; extremely acid
Subsoil:
10 to 19 inches—brownish yellow loam; extremely acid
19 to 26 inches—light yellowish brown and brownish yellow clay loam; very strongly acid
26 to 36 inches—light yellowish brown clay loam; extremely acid
36 to 61 inches—gray and red clay; extremely acid
61 to 80 inches—gray clay; extremely acid

Eastwood

Surface layer:
0 to 4 inches—brown very fine sandy loam; strongly acid
Subsoil:
4 to 13 inches—yellowish red clay; very strongly acid
13 to 30 inches—red clay; very strongly acid
30 to 41 inches—light brownish gray and red clay; very strongly acid
41 to 47 inches—light brownish gray clay; very strongly acid

Substratum:

47 to 80 inches—dark reddish gray and gray clay loam; very strongly acid

Latex

Surface layer:

0 to 7 inches—brown fine sandy loam; moderately acid

Subsurface layer:

7 to 11 inches—brown very fine sandy loam; moderately acid

Subsoil:

11 to 22 inches—strong brown loam; strongly acid

22 to 30 inches—strong brown sandy clay loam; very strongly acid

30 to 40 inches—reddish yellow loam; very strongly acid

40 to 55 inches—brownish yellow loam; very strongly acid

55 to 58 inches—red clay loam; very strongly acid

58 to 80 inches—dark red and light brownish gray clay; very strongly acid

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

3. Cuthbert-Tenaha-Darco

Map Unit Composition

Extent of the map unit in the county: 20 percent

Extent of the components in the map unit:

Cuthbert soils—35 percent

Tenaha soils—24 percent

Darco soils—22 percent

Minor inclusions—19 percent

Minor Inclusions

- Bowie soils, which are yellowish loamy soils with plinthite; on interfluves (4 percent of map unit)
- Laneville soils, which have brownish yellow loamy material over clayey material; on flood plains (3 percent of map unit)
- Dreka soils, which are grayish silty soils; on flood plains (2 percent of map unit)
- Owentown soils, which are brownish coarse-loamy soils; on natural levees on flood plains (2 percent of map unit)
- Sawtown soils, which have very fine sandy loam about 20 inches thick that is over yellowish loamy material over a grayish clayey subsoil; on mounds on marine and stream terraces (2 percent of map unit)
- Metcalf soils, which have yellowish loam that has gray depletions over a grayish clayey subsoil; on intermounds, at the heads of drains, and on upland flats on marine and stream terraces (1 percent of map unit)
- Latex soils, which have yellowish loamy upper horizons over grayish clayey lower horizons with reddish redoximorphic concentrations; on interfluves (2 percent of map unit)
- Timpson soils, which have a thick surface layer of very fine sandy loam over yellowish silty material over a grayish clayey subsoil; on mounds on stream and marine terraces (1 percent of map unit)
- Mollville soils, which are very deep and sandy; on interfluves (1 percent of map unit)

- Areas of water, which consist of farm ponds and small lakes for recreational uses (1 percent of map unit)

Soil Properties and Qualities

Cuthbert

Major land resource area: Western Coastal Plain (133B)
Landform: Drainageway on coastal plain
Hillslope position: Linear
Parent material: Interbedded sandstone and shale
Slope range: 5 to 15 percent
Surface fragments: None
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Slowest permeability: Slow (about 0.06 in/hr)
Available water capacity: Very low (about 2.7 inches)
Shrink-swell potential: Moderate (about 4.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: More than 6 feet
Runoff class: Medium
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 6e

Tenaha

Major land resource area: Western Coastal Plain (133B)
Landform: Drainageway on coastal plain
Hillslope position: Convex
Parent material: Sandy stratified sandstone and shale
Slope range: 5 to 15 percent
Surface fragments: None
Depth to restrictive feature: 40 to 60 inches to bedrock (densic)
Drainage class: Well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Very low (about 2.5 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: More than 6 feet
Runoff class: Low
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 6e

Darco

Major land resource area: Western Coastal Plain (133B)
Landform: Interfluvium on coastal plain
Hillslope position: Linear
Parent material: Sandy and loamy sediments
Slope range: 8 to 15 percent
Surface fragments: None
Depth to restrictive feature: None
Drainage class: Somewhat excessively drained
Slowest permeability: Moderate (about 0.57 in/hr)

Soil Survey of Shelby County, Texas

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Ecological site: Unspecified

Land capability classification (non-irrigated areas): 6e

Typical Profile

Cuthbert

Surface layer:

0 to 5 inches—dark grayish brown fine sandy loam; moderately acid

Subsoil:

5 to 14 inches—red clay; strongly acid

14 to 20 inches—red clay; very strongly acid

20 to 30 inches—40 percent light gray, 30 percent red, and 30 percent reddish brown clay loam; very strongly acid

Substratum:

30 to 41 inches—35 percent light gray, 35 percent yellowish brown, and 30 percent strong brown clay loam; extremely acid

41 to 80 inches—light gray weathered bedrock; extremely acid

Tenaha

Surface layer:

0 to 2 inches—dark grayish brown loamy fine sand; strongly acid

Subsurface layer:

2 to 6 inches—light yellowish brown loamy fine sand; moderately acid

6 to 29 inches—light yellowish brown loamy fine sand; very strongly acid

Subsoil:

29 to 35 inches—yellowish brown sandy clay loam; very strongly acid

35 to 41 inches—yellowish brown sandy clay loam; very strongly acid

41 to 55 inches—yellowish brown fine sandy loam; very strongly acid

Substratum:

55 to 75 inches—yellowish brown, red, and pale brown fine sandy loam; very strongly acid

75 to 80 inches—light gray and reddish brown weathered bedrock; very strongly acid

Darco

Surface layer:

0 to 6 inches—brown loamy fine sand; very strongly acid

Subsurface layer:

6 to 19 inches—light yellowish brown loamy fine sand; very strongly acid

19 to 49 inches—light yellowish brown loamy fine sand; very strongly acid

Subsoil:

49 to 54 inches—yellowish brown fine sandy loam; very strongly acid

54 to 61 inches—yellowish brown sandy clay loam; very strongly acid

61 to 74 inches—yellowish brown sandy clay loam; very strongly acid

74 to 80 inches—reddish yellow and yellowish red sandy clay loam; very strongly acid

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

4. Laneville-Dreka

Map Unit Composition

Extent of the map unit in the county: 9 percent

Extent of the components in the map unit:

Laneville soils—44 percent

Dreka soils—42 percent

Minor inclusions—14 percent

Minor Inclusions

- Austonio soils, which are deep brownish loamy soils; on side slopes on terraces (3 percent of map unit)
- Maben soils, which are deep variegated reddish and grayish clayey soils that are 20 to 40 inches thick over shale; on interfluves and side slopes (2 percent of map unit)
- Alazan soils, which are yellowish loamy soils with gray depletions; at the heads of drains, on toeslopes, and on intermounds on marine and stream terraces (1 percent of map unit)
- Mollville soils, which are grayish and loamy; in depressional areas on stream terraces (2 percent of map unit)
- Besner soils, which are very deep brownish coarse-loamy soils; on terraces (1 percent of map unit)
- Areas of water, which consist of farm ponds and small lakes for recreational uses (1 percent of map unit)
- Hainesville soils, which are very deep sandy soils; on terraces (1 percent of map unit)
- Eastwood soils, which are deep variegated reddish and grayish clayey soils that are 40 to 60 inches thick over shale; on interfluves and side slopes (1 percent of map unit)
- Bernaldo soils, which are very deep brownish loamy soils; on terraces (2 percent of map unit)

Soil Properties and Qualities

Laneville

Major land resource area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Loamy and clayey alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.4 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: Frequent

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 36 inches

Runoff class: Very low

Ecological site: Unspecified

Land capability classification (non-irrigated areas): 5w

Dreka

Major land resource area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Loamy and clayey alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat poorly drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.5 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: Frequent

Ponding hazard: None

Depth to seasonal water saturation: About 6 to 30 inches

Runoff class: Unspecified

Ecological site: Unspecified

Land capability classification (non-irrigated areas): 5w

Typical Profile

Laneville

Surface layer:

0 to 7 inches—brown loam; very strongly acid

Subsoil:

7 to 10 inches—yellowish brown, grayish brown, and dark yellowish brown loam; very strongly acid

10 to 24 inches—yellowish brown, dark yellowish brown, and grayish brown silt loam; very strongly acid

24 to 35 inches—grayish brown clay loam; very strongly acid

35 to 45 inches—grayish brown clay; very strongly acid

45 to 80 inches—grayish brown clay; very strongly acid

Dreka

Surface layer:

0 to 9 inches—grayish brown loam; moderately acid

Subsoil:

9 to 13 inches—light brownish gray clay loam; moderately acid

13 to 30 inches—light brownish gray clay loam; moderately acid

30 to 43 inches—grayish brown clay loam; slightly acid

43 to 80 inches—grayish brown clay; slightly alkaline

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

5. Metcalf-Timpson

Map Unit Composition

Extent of the map unit in the county: 5 percent

Soil Survey of Shelby County, Texas

Extent of the components in the map unit:

- Metcalfe soils—40 percent
- Timpson soils—29 percent
- Minor inclusions—31 percent

Minor Inclusions

- Eastwood soils, which are deep variegated reddish and grayish clayey soils that are 40 to 60 inches thick over shale; on interfluvial and side slopes (5 percent of unit)
- Maben soils, which are deep variegated reddish and grayish clayey soils that are 20 to 40 inches thick over shale; on interfluvial and side slopes (4 percent of map unit)
- Laneville soils, which have brownish yellow loamy material over gray clayey material; on flood plains (3 percent of map unit)
- Areas of water, which consist of farm ponds and small lakes used for recreational uses (2 percent of map unit)
- Owentown soils, which are brownish coarse-loamy soils; on natural levees on flood plains (2 percent of map unit)
- Bernaldo soils, which are very deep brownish loamy soils; on terraces (2 percent of map unit)
- Dreka soils, which are grayish silty soils; on flood plains (2 percent of map unit)
- Austonio soils, which are deep brownish loamy soils; on side slopes on terraces (1 percent of map unit)
- Meth soils, which are deep red clayey soils; on knobs and ridges (1 percent of map unit)
- Cuthbert soils, which are moderately deep red clayey soils over stratified sandstone and shale; on side slopes (1 percent of map unit)

Soil Properties and Qualities

Metcalfe

Major land resource area: Western Coastal Plain (133B)
Landform: Marine terrace on coastal plain
Hillslope position: None
Parent material: Loamy over clayey deposits
Slope range: 0 to 2 percent
Surface fragments: None
Depth to restrictive feature: None
Drainage class: Somewhat poorly drained
Slowest permeability: Impermeable (about 0.00 in/hr)
Available water capacity: Low (about 4.0 inches)
Shrink-swell potential: High (about 7.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 18 to 30 inches
Runoff class: High
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 2w

Timpson

Major land resource area: Western Coastal Plain (133B)
Landform: Mound on stream terrace and mound on marine terrace
Hillslope position: None
Parent material: Loamy over clayey deposits
Slope range: 0 to 2 percent
Surface fragments: None
Depth to restrictive feature: None

Soil Survey of Shelby County, Texas

Drainage class: Moderately well drained
Slowest permeability: Moderately slow (about 0.20 in/hr)
Available water capacity: Low (about 4.0 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 30 to 42 inches
Runoff class: Low
Ecological site: Unspecified
Land capability classification (non-irrigated areas): 2w

Typical Profile

Metcalf

Surface layer:
0 to 4 inches—dark grayish brown silt loam; strongly acid

Subsurface layer:
4 to 11 inches—yellowish brown silt loam; very strongly acid

Subsoil:
11 to 20 inches—yellowish brown silt loam; extremely acid
20 to 30 inches—yellowish brown loam; extremely acid
30 to 37 inches—yellowish brown loam; very strongly acid
37 to 41 inches—grayish brown clay; very strongly acid
41 to 49 inches—grayish brown clay loam; very strongly acid
49 to 65 inches—light yellowish brown clay loam; very strongly acid

Substratum:
65 to 72 inches—light olive brown loam; extremely acid
72 to 80 inches—yellowish brown fine sandy loam; very strongly acid

Timpson

Surface layer:
0 to 7 inches—dark grayish brown silt loam; strongly acid

Subsurface layer:
7 to 13 inches—yellowish brown very fine sandy loam; very strongly acid

Subsoil:
13 to 20 inches—strong brown very fine sandy loam; extremely acid
20 to 27 inches—strong brown loam; very strongly acid
27 to 34 inches—strong brown loam; very strongly acid
34 to 43 inches—yellowish brown loam; very strongly acid
43 to 52 inches—light yellowish brown loam; very strongly acid
52 to 55 inches—light brownish gray clay loam; very strongly acid
55 to 61 inches—gray clay loam; very strongly acid
61 to 73 inches—light brownish gray clay loam; very strongly acid
73 to 80 inches—strong brown sandy clay loam; very strongly acid

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Detailed Soil Map Units

The map units delineated on the detailed soil maps represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called similar components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase

commonly indicates a feature that affects use or management. For example, Cuthbert fine sandy loam, 5 to 15 percent slopes, is a phase of the Cuthbert series.

Some map units are made up of two or more major soils. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded, is an example.

This soil survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Water is an example of a miscellaneous area.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

AbA—Alazan-Besner complex, 0 to 1 percent slopes, mounded

Map Unit Composition

Major components:

- Alazan and similar soils—40 to 60 percent
- Besner and similar soils—30 to 50 percent

Contrasting inclusions:

- Guyton soils—0 to 20 percent

Component Descriptions

Alazan

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.5 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 30 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 2w

Besner

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Circular to elongated mound on stream terrace

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Soil Survey of Shelby County, Texas

Depth to restrictive feature: None
Drainage class: Well drained
Slowest permeability: Moderate (about 0.57 in/hr)
Available water capacity: Low (about 3.4 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 40 to 60 inches
Runoff class: Negligible
Land capability classification (non-irrigated): 2e

Typical Profile

Alazan

Surface layer:
0 to 5 inches—brown very fine sandy loam; moderately acid

Subsurface layer:
5 to 11 inches—pale brown very fine sandy loam; moderately acid

Subsoil:
11 to 20 inches—yellowish brown loam; strongly acid
20 to 37 inches—strong brown sandy clay loam; strongly acid
37 to 46 inches—sandy clay loam; strongly acid
46 to 80 inches—sandy clay loam; strongly acid

Besner

Surface layer:
0 to 7 inches—brown fine sandy loam; moderately acid

Subsurface layer:
7 to 24 inches—light yellowish brown fine sandy loam; moderately acid

Subsoil:
24 to 39 inches—yellowish brown loam; strongly acid
39 to 53 inches—brownish yellow loam; strongly acid
53 to 80 inches—yellowish brown sandy clay loam; strongly acid

Contrasting Inclusions

- Guyton soils, which are gray throughout and occur on flats or in closed depressions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- These soils are well suited to pasture.

Woodland

- See Woodland Management Groups 5 and 7, which are described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.

- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. These soils are poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.

AtB—Attoyac fine sandy loam, 0 to 5 percent slopes

Map Unit Composition

Major components:

Attoyac and similar soils—90 to 100 percent

Contrasting inclusions:

Hainesville soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.7 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very low

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 5 inches—brown fine sandy loam; very strongly acid

Subsurface layer:

5 to 10 inches—yellowish brown fine sandy loam; very strongly acid

Subsoil:

10 to 28 inches—red fine sandy loam; very strongly acid

28 to 48 inches—red sandy clay loam; very strongly acid

48 to 62 inches—red sandy clay loam; very strongly acid

62 to 80 inches—red sandy clay loam; very strongly acid

Contrasting Inclusions

- Hainesville soils, which are sandy throughout

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 3, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- This soil is well suited to building site development.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.

AuD—Austonio fine sandy loam, 5 to 12 percent slopes

Map Unit Composition

Major components:

Austonio and similar soils—80 to 90 percent

Contrasting inclusions:

Cuthbert soils—10 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: Convex

Parent material: Loamy alluvium

Slope range: 5 to 12 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.2 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Medium

Land capability classification (non-irrigated): 4e

Typical Profile

Surface layer:

0 to 8 inches—brown fine sandy loam; extremely acid

Subsurface layer:

8 to 16 inches—pale brown fine sandy loam; moderately acid

Subsoil:

16 to 27 inches—yellowish brown sandy clay loam; extremely acid

27 to 41 inches—yellowish brown sandy clay loam; extremely acid

41 to 53 inches—yellowish brown sandy clay loam; extremely acid

53 to 70 inches—brownish yellow sandy clay loam; extremely acid

Substratum:

70 to 80 inches—brownish yellow and light brownish gray fine sandy loam; very strongly acid

Contrasting Inclusions

- Cuthbert soils, which have a surface layer that contains 15 to 35 percent gravel

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 3, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 7, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.

- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines and seepage of poorly treated effluent is a concern.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

BaB—Bernaldo fine sandy loam, 0 to 3 percent slopes

Map Unit Composition

Major components:

Bernaldo and similar soils—80 to 100 percent

Contrasting inclusions:

Guyton soils—0 to 10 percent

Metcalf soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 3 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.7 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 48 to 72 inches

Runoff class: Very low

Land capability classification (non-irrigated): 2e

Typical Profile

Surface layer:

0 to 5 inches—brown fine sandy loam; moderately acid

Subsurface layer:

5 to 15 inches—light yellowish brown fine sandy loam; moderately acid

Subsoil:

15 to 27 inches—yellowish brown clay loam; strongly acid

27 to 41 inches—yellowish brown sandy clay loam; strongly acid

41 to 54 inches—yellowish brown sandy clay loam; strongly acid

54 to 80 inches—yellowish brown and light yellowish brown sandy clay loam; strongly acid

Contrasting Inclusions

- Guyton soils, which are gray throughout and occur in closed depressions
- Metcalf soils, which are somewhat poorly drained and occur in the intermound positions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- This soil is well suited to pasture.

Woodland

- See Woodland Management Group 3, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.

Septic tank absorption fields

- The restricted permeability and the seasonal high water table limit the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- This soil is well suited to local roads and streets.

BeA—Besner fine sandy loam, 0 to 3 percent slopes

Map Unit Composition

Major components:

Besner and similar soils—40 to 100 percent

Contrasting inclusions:

Mollville soils—0 to 30 percent

Alazan soils—0 to 30 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 3 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.3 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 40 to 60 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 2e

Typical Profile

Surface layer:

0 to 5 inches—brown fine sandy loam; very strongly acid

Subsurface layer:

5 to 13 inches—yellowish brown fine sandy loam; strongly acid

13 to 19 inches—25 percent strong brown and 75 percent yellowish brown fine sandy loam; very strongly acid

19 to 51 inches—brown fine sandy loam; very strongly acid

Subsoil:

51 to 80 inches—strong brown fine sandy loam; extremely acid

Contrasting Inclusions

- Mollville soils, which are gray throughout and are on low wet flats
- Alazan soils, which are moderately well drained and are in intermound positions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- This soil is well suited to pasture.

Woodland

- See Woodland Management Group 7, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- This soil is well suited to local roads and streets.

BfC—Betis loamy fine sand, 0 to 8 percent slopes

Map Unit Composition

Major components:

Betis and similar soils—90 to 100 percent

Contrasting inclusions:

Kirvin soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Broad interstream divide on coastal plain

Hillslope position: None

Parent material: Sandy sediments

Slope range: 0 to 8 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat excessively drained

Slowest permeability: Rapid (about 5.95 in/hr)

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very low

Land capability classification (non-irrigated): 3s

Typical Profile

Surface layer:

0 to 7 inches—brown loamy fine sand; strongly acid

Subsoil:

7 to 28 inches—light brown loamy fine sand; very strongly acid

Subsurface layer:

28 to 43 inches—light yellowish brown loamy fine sand; very strongly acid

43 to 55 inches—yellowish brown loamy fine sand; very strongly acid

55 to 80 inches—light yellowish brown loamy fine sand; very strongly acid

Contrasting Inclusions

- Kirvin soils, which are deep, have a clayey subsoil, and may have a gravelly surface layer in some areas

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 6, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 13, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Sandy layers increase the maintenance of haul roads and log landings.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- This soil is well suited to building site development.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- This soil is well suited to local roads and streets.

BnA—Bonn-Cart complex, 0 to 2 percent slopes, mounded

Map Unit Composition

Major components:

Bonn and similar soils—50 to 70 percent
Cart and similar soils—30 to 50 percent

Component Descriptions

Bonn

Major Land Resource Area: Western Coastal Plain (133B)
Landform: Open depression on stream terrace
Hillslope position: None
Parent material: Loamy alluvium
Slope range: 0 to 1 percent
Surface fragments: None
Depth to restrictive feature: 8 to 16 inches to natric material
Drainage class: Poorly drained
Slowest permeability: Impermeable (about 0.00 in/hr)
Available water capacity: Very low (about 0.9 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 0 to 14 inches
Runoff class: Unspecified
Land capability classification (non-irrigated): 4s

Cart

Major Land Resource Area: Western Coastal Plain (133B)
Landform: Mound on stream terrace
Hillslope position: None
Parent material: Loamy alluvium
Slope range: 0 to 2 percent
Surface fragments: None
Depth to restrictive feature: 40 to 57 inches to fragipan
Drainage class: Well drained
Slowest permeability: Slow (about 0.06 in/hr)
Available water capacity: Low (about 3.2 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 36 to 48 inches
Runoff class: Low
Land capability classification (non-irrigated): 2e

Typical Profile

Bonn

Surface layer:
0 to 3 inches—dark grayish brown silt loam; very strongly acid

Subsurface layer:
3 to 13 inches—grayish brown silt loam; strongly acid
13 to 31 inches—40 percent dark grayish brown and 60 percent light brownish gray silt loam; very strongly acid

Subsoil:
31 to 42 inches—40 percent light brownish gray and 60 percent dark grayish brown clay loam; neutral
42 to 56 inches—gray clay loam; neutral
56 to 68 inches—gray clay loam; slightly alkaline
68 to 83 inches—gray clay loam; slightly alkaline

Cart

Surface layer:

0 to 4 inches—brown very fine sandy loam; very strongly acid

Subsurface layer:

4 to 11 inches—brown very fine sandy loam; strongly acid

11 to 17 inches—yellowish brown loam; very strongly acid

Subsoil:

17 to 33 inches—strong brown loam; very strongly acid

33 to 57 inches—yellowish brown loam; very strongly acid

57 to 65 inches—yellowish brown loam; very strongly acid

65 to 80 inches—gray clay loam; very strongly acid

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Groups 1 and 10, which are described in the section “Use and Management of the Soils.”
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- These soils provide poor summer pasture.
- Excess water should be removed, or grass or legume species that are adapted to wet soil conditions should be planted.
- Restricting grazing during wet periods can minimize compaction.

Woodland

- See Woodland Management Groups 7 and 21, which are described in the section “Use and Management of the Soils.”
- A seasonal high water table can inhibit the growth of some species of seedlings by reducing root respiration.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Soil wetness may limit the use of log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. These soils are poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.

Septic tank absorption fields

- Because of the seasonal high water table, these soils are generally unsuited to septic tank absorption fields.

Local roads and streets

- Because of shrinking and swelling, these soils may not be suitable for use as base material for local roads and streets.
- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

BwB—Bowie fine sandy loam, 1 to 5 percent slopes

Map Unit Composition

Major components:

Bowie and similar soils—60 to 100 percent

Contrasting inclusions:

Lilbert soils—0 to 20 percent

Kirvin soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Interfluvium on coastal plain

Hillslope position: None

Parent material: Loamy marine sediments

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: 25 to 60 inches to plinthite

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 42 to 60 inches

Runoff class: Low

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 9 inches—brown fine sandy loam; slightly acid

Subsurface layer:

9 to 17 inches—light yellowish brown fine sandy loam; moderately acid

Subsoil:

17 to 25 inches—brownish yellow sandy clay loam; strongly acid

25 to 41 inches—yellowish brown sandy clay loam; strongly acid

41 to 80 inches—yellowish brown sandy clay loam; very strongly acid

Contrasting Inclusions

- Lilbert soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick
- Kirvin soils, which have a clayey subsoil

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 4, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 7, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.

CbE—Cuthbert fine sandy loam, 5 to 15 percent slopes

Map Unit Composition

Major components:

Cuthbert and similar soils—60 to 100 percent

Contrasting inclusions:

Darco soils—0 to 20 percent

Tenaha soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Soil Survey of Shelby County, Texas

Landform: Drainageway on coastal plain

Hillslope position: Linear

Parent material: Interbedded sandstone and shale

Slope range: 5 to 15 percent

Surface fragments: None

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Very low (about 1.4 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Medium

Land capability classification (non-irrigated): 6e

Typical Profile

Surface layer:

0 to 5 inches—dark grayish brown fine sandy loam; moderately acid

Subsoil:

5 to 14 inches—red clay; strongly acid

14 to 20 inches—red clay; very strongly acid

20 to 30 inches—30 percent red, 30 percent reddish brown, and 40 percent light gray clay loam; very strongly acid

Substratum:

30 to 41 inches—30 percent strong brown, 35 percent light gray, and 35 percent yellowish brown clay loam; extremely acid

41 to 80 inches—light gray weathered bedrock; extremely acid

Contrasting Inclusions

- Darco soils, which are very deep and have a thick sandy surface layer and subsurface layer that range from 40 to 79 inches in thickness
- Tenaha soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 7, which is described in the section “Use and Management of the Soils.”
- Avoiding overgrazing can reduce the hazard of erosion.
- Maintaining healthy plants and vegetative cover can reduce the hazard of erosion.
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.
- The rooting depth of plants may be restricted by a dense soil layer.

Woodland

- See Woodland Management Group 16, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines and seepage of poorly treated effluent is a concern.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

CgE—Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes

Map Unit Composition

Major components:

Cuthbert and similar soils—80 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Convex

Soil Survey of Shelby County, Texas

Parent material: Interbedded sandstone and shale

Slope range: 5 to 15 percent

Surface fragments: About 0.00 to 0.10 percent coarse subrounded gravel

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Very low (about 1.8 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: High

Land capability classification (non-irrigated): 6e

Typical Profile

Surface layer:

0 to 3 inches—brown gravelly fine sandy loam; very strongly acid

Subsurface layer:

3 to 6 inches—yellowish red gravelly fine sandy loam; very strongly acid

Subsoil:

6 to 15 inches—red clay; very strongly acid

15 to 24 inches—red clay; very strongly acid

24 to 31 inches—dark red, light brownish gray, brownish yellow, and red clay; very strongly acid

Substratum:

31 to 37 inches—light brownish gray and dark red clay loam; very strongly acid

37 to 80 inches—light brownish gray and dark red weathered bedrock; very strongly acid

Contrasting Inclusions

- Tenaha soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See Pasture Management Group 9, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.
- The rooting depth of plants may be restricted by a dense soil layer.

Woodland

- See Woodland Management Group 15, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.

- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- Rock fragments obstruct the use of mechanical planting equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines and seepage of poorly treated effluent is a concern.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

CrG—Cuthbert soils, 5 to 15 percent slopes, graded

Map Unit Composition

Major components:

Cuthbert and similar soils—60 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 40 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Convex

Parent material: Interbedded sandstone and shale

Slope range: 5 to 15 percent

Surface fragments: About 0.00 to 0.10 percent coarse subrounded gravel

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Very low (about 1.5 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Medium

Land capability classification (non-irrigated): 6e

Typical Profile

Surface layer:

0 to 2 inches—brown gravelly clay loam; very strongly acid

Subsoil:

2 to 6 inches—yellowish red clay; very strongly acid

6 to 22 inches—yellowish red and light brownish gray clay; very strongly acid

Substratum:

22 to 30 inches—light brownish gray weathered bedrock; very strongly acid

30 to 80 inches—light brownish gray, gray, strong brown, and red weathered bedrock;
very strongly acid

Contrasting Inclusions

- Tenaha soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See Pasture Management Group 12, which is described in the section “Use and Management of the Soils.”
- Avoiding overgrazing can reduce the hazard of erosion.
- Maintaining healthy plants and vegetative cover can reduce the hazard of erosion.
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.
- The rooting depth of plants may be restricted by a dense soil layer.

Woodland

- See Woodland Management Group 18, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- Rock fragments obstruct the use of mechanical planting equipment.

- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines and seepage of poorly treated effluent is a concern.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- Because of the slope, designing local roads and streets is difficult.

CsG—Cuthbert fine sandy loam, 5 to 35 percent slopes, stony

Map Unit Composition

Major components:

Cuthbert and similar soils—80 to 100 percent

Contrasting inclusions:

Darco soils—0 to 10 percent

Tenaha soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Convex

Parent material: Interbedded sandstone and shale

Slope range: 5 to 35 percent

Surface fragments: About 0.01 to 0.10 percent subrounded stones

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Very low (about 1.0 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Medium

Land capability classification (non-irrigated): 7s

Typical Profile

Surface layer:

0 to 2 inches—brown fine sandy loam; strongly acid

Subsurface layer:

2 to 15 inches—brown fine sandy loam; strongly acid

Subsoil:

15 to 20 inches—yellowish red clay loam; very strongly acid

20 to 25 inches—yellowish red clay loam; very strongly acid

Substratum:

25 to 45 inches—yellowish red sandy clay loam; very strongly acid

45 to 55 inches—yellowish red fine sandy loam; very strongly acid

55 to 60 inches—yellowish red fine sandy loam; very strongly acid

Contrasting Inclusions

- Darco soils, which are very deep and have a sandy upper part that ranges from 40 to 80 inches in thickness
- Tenaha soils, which have sandy surface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See pasture management group “not suited,” which is described in the section “Use and Management of the Soils.”
- This soil is generally not recommended for pasture.
- The rooting depth of plants may be restricted by a dense soil layer.

Woodland

- See Woodland Management Group 19, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The slope increases excavation costs, poses safety hazards, and creates a potential for erosion during the construction of haul roads and log landings.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks and harvesting and mechanical planting equipment.
- The slope may restrict the use of some mechanical planting equipment.
- The slope restricts the use of equipment for preparing sites for planting and seeding.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs are required to ensure satisfactory performance.
- The moderate shrinking and swelling of the soil may crack foundations and

basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.

- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- Because of the slope, designing local roads and streets is difficult.

CtG—Cuthbert fine sandy loam, 15 to 35 percent slopes

Map Unit Composition

Major components:

Cuthbert and similar soils—60 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 20 percent

Darco soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Linear

Parent material: Interbedded sandstone and shale

Slope range: 15 to 35 percent

Surface fragments: None

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Very low (about 1.6 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: High

Land capability classification (non-irrigated): 7e

Typical Profile

Surface layer:

0 to 5 inches—brown fine sandy loam; very strongly acid

Subsurface layer:

5 to 10 inches—yellowish brown fine sandy loam; very strongly acid

Subsoil:

10 to 19 inches—reddish yellow clay; very strongly acid

19 to 28 inches—yellowish red clay; very strongly acid

28 to 33 inches—yellowish red clay; very strongly acid

Substratum:

33 to 80 inches—reddish yellow fine sandy loam; very strongly acid

Contrasting Inclusions

- Tenaha soils, which have sandy surface and subsurface layers that range from 20 to 40 inches in thickness
- Darco soils, which are very deep and have sandy surface and subsurface layers ranging from 40 to 79 inches in thickness

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See pasture management group “not suited,” which is described in the section “Use and Management of the Soils.”
- This soil is generally not recommended for pasture.
- The rooting depth of plants may be restricted by a dense soil layer.

Woodland

- See Woodland Management Group 11, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The slope increases excavation costs, poses safety hazards, and creates a potential for erosion during the construction of haul roads and log landings.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks and harvesting and mechanical planting equipment.
- Because of the slope, the use of mechanical planting equipment is not practical.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The slope restricts the use of equipment for preparing sites for planting and seeding.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs are required to ensure satisfactory performance.
- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

DaC—Darco loamy fine sand, 1 to 8 percent slopes

Map Unit Composition

Major components:

Darco and similar soils—90 to 100 percent

Contrasting inclusions:

Kirvin soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Interfluvium on coastal plain

Hillslope position: None

Parent material: Sandy and loamy sediments

Slope range: 1 to 8 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat excessively drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Very low (about 1.9 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very low

Land capability classification (non-irrigated): 3s

Typical Profile

Surface layer:

0 to 5 inches—brown loamy fine sand; strongly acid

Subsurface layer:

5 to 21 inches—yellowish brown loamy fine sand; moderately acid

21 to 62 inches—light yellowish brown loamy fine sand; strongly acid

Subsoil:

62 to 80 inches—yellowish red fine sandy loam; very strongly acid

Contrasting Inclusions

- Kirvin soils, which are deep and have a clayey subsoil

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses (fig. 3)



Figure 3.—Coastal pasture in an area of Darco loamy fine sand, 1 to 8 percent slopes.

Pastureland

- See Pasture Management Group 6, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 13, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- The slope may restrict the use of some mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- This soil is well suited to building site development.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- This soil is well suited to local roads and streets.

DaE—Darco loamy fine sand, 8 to 15 percent slopes

Map Unit Composition

Major components:

Darco and similar soils—80 to 100 percent

Contrasting inclusions:

Cuthbert soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Linear

Parent material: Sandy and loamy sediments

Slope range: 8 to 15 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat excessively drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 6e

Typical Profile

Surface layer:

0 to 6 inches—brown loamy fine sand; very strongly acid

Subsurface layer:

6 to 19 inches—light yellowish brown loamy fine sand; very strongly acid

19 to 49 inches—light yellowish brown loamy fine sand; very strongly acid

Subsoil:

49 to 54 inches—yellowish brown fine sandy loam; very strongly acid

54 to 61 inches—yellowish brown sandy clay loam; very strongly acid

61 to 74 inches—yellowish brown sandy clay loam; very strongly acid

74 to 80 inches—reddish yellow and yellowish red sandy clay loam; very strongly acid

Contrasting Inclusions

- Cuthbert soils, which are moderately deep, have a clayey subsoil, and may have a gravelly or stony surface layer in some areas

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 8, which is described in the section “Use and Management of the Soils.”
- Avoiding overgrazing and maintaining healthy plants and vegetative cover can reduce the hazard of erosion.
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 13, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Sandy layers increase the maintenance of haul roads and log landings.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- The slope may restrict the use of some mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- Because of the slope, designing local roads and streets is difficult.

Dr—Dreka loam, 0 to 1 percent slopes, frequently flooded

Map Unit Composition

Major components:

Dreka and similar soils—60 to 100 percent

Contrasting inclusions:

lulus soils—0 to 20 percent

Laneville soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Loamy and clayey alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat poorly drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.5 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: Frequent (fig. 4)

Ponding hazard: None

Depth to seasonal water saturation: About 6 to 30 inches

Runoff class: Unspecified

Land capability classification (non-irrigated): 5w

Typical Profile

Surface layer:

0 to 9 inches—grayish brown loam; moderately acid

Subsoil:

9 to 13 inches—light brownish gray clay loam; moderately acid

13 to 30 inches—light brownish gray clay loam; moderately acid

30 to 43 inches—grayish brown clay loam; slightly acid

43 to 80 inches—grayish brown clay; slightly alkaline

Contrasting Inclusions

- lulus soils, which are occasionally flooded and are on birms along creeks
- Laneville soils, which are in occasionally flooded areas

Use and Management

Major land uses: Most areas are used for wildlife or recreational uses

Pastureland

- See Pasture Management Group 11, which is described in the section “Use and Management of the Soils.”
- Forage production can be improved by seeding grass-legume mixtures that are tolerant of flooding.
- Sediment left on forage plants after a flood event may reduce palatability and forage intake by the grazing animal.



Figure 4.—An area of Dreka loam, 0 to 1 percent slopes, frequently flooded.

- Excess water should be removed, or grass or legume species that are adapted to wet soil conditions should be planted.

Woodland

- See Woodland Management Group 6, which is described in the section “Use and Management of the Soils.”
- Standing water can inhibit the growth of some species of seedlings by restricting root respiration.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Soil wetness may limit the use of log trucks.
- Flooding restricts the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The frequent flooding greatly increases the risk of damage associated with floodwaters. Because of the flooding, this soil is generally unsuited to building site development.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- This soil is generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Special design of roads and bridges is needed to prevent the damage caused by flooding.

EeB—Eastwood very fine sandy loam, 1 to 5 percent slopes

Map Unit Composition

Major components:

Eastwood and similar soils—80 to 100 percent

Contrasting inclusions:

Metcalf soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Interfluvium on coastal plain

Hillslope position: None

Parent material: Clayey marine deposits

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Very slow (about 0.00 in/hr)

Available water capacity: Low (about 3.3 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very high

Land capability classification (non-irrigated): 4e

Typical Profile

Surface layer:

0 to 7 inches—dark grayish brown very fine sandy loam; very strongly acid

Subsurface layer:

7 to 10 inches—brown very fine sandy loam; strongly acid

Subsoil:

10 to 19 inches—dark red clay; very strongly acid

19 to 30 inches—dark red clay; very strongly acid

30 to 40 inches—light brownish gray clay; very strongly acid

40 to 55 inches—light brownish gray clay; very strongly acid

Substratum:

55 to 67 inches—strong brown and light gray sandy clay loam; extremely acid

67 to 80 inches—yellowish red, brownish yellow, and grayish brown clay loam; extremely acid

Contrasting Inclusions

- Metcalf soils, which are loamy in the upper part

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 7, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 14, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

EeD—Eastwood very fine sandy loam, 5 to 15 percent slopes

Map Unit Composition

Major components:

Eastwood and similar soils—90 to 100 percent

Contrasting inclusions:

Metcalf soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Linear

Parent material: Clayey marine deposits

Slope range: 5 to 15 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Very slow (about 0.00 in/hr)

Available water capacity: Very low (about 2.8 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very high

Land capability classification (non-irrigated): 6e

Typical Profile

Surface layer:

0 to 4 inches—brown very fine sandy loam; strongly acid

Subsoil:

4 to 13 inches—yellowish red clay; very strongly acid

13 to 30 inches—red clay; very strongly acid

30 to 41 inches—light brownish gray and red clay; very strongly acid

41 to 47 inches—light brownish gray clay; very strongly acid

Substratum:

47 to 80 inches—dark reddish gray and gray clay loam; very strongly acid

Contrasting Inclusions

- Metcalf soils, which are on toeslopes and at the heads of drains and are loamy in the upper part

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See Pasture Management Group 9, which is described in the section “Use and Management of the Soils.”
- Avoiding overgrazing can reduce the hazard of erosion.
- Maintaining healthy plants and vegetative cover can reduce the hazard of erosion.
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 14, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the content of clay, this soil becomes sticky when wet. The stickiness increases the cost of constructing haul roads and log landings.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- Uncontrolled burning may destroy organic matter.

Building sites

- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines and seepage of poorly treated effluent is a concern.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

EIA—Eastwood-Latex complex, 1 to 3 percent slopes, mounded

Map Unit Composition

Major components:

- Eastwood and similar soils—45 to 55 percent
- Latex and similar soils—35 to 45 percent

Contrasting inclusions:

Metcalf soils—0 to 20 percent

Component Descriptions

Eastwood

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Marine terrace on coastal plain

Hillslope position: None

Parent material: Clayey marine deposits

Slope range: 1 to 3 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Very slow (about 0.00 in/hr)

Available water capacity: Very low (about 2.6 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Very high

Land capability classification (non-irrigated): 3e

Latex

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Mound on marine terrace

Hillslope position: None

Parent material: Loamy over clayey sediments

Slope range: 1 to 3 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.5 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 36 to 54 inches

Runoff class: Low

Land capability classification (non-irrigated): 2e

Typical Profile

Eastwood

Surface layer:

0 to 6 inches—brown very fine sandy loam; very strongly acid

Subsoil:

6 to 14 inches—red clay; very strongly acid

14 to 35 inches—red clay; very strongly acid

35 to 43 inches—light yellowish brown clay loam; very strongly acid

Substratum:

43 to 80 inches—light yellowish brown, light brownish gray, and brownish yellow silty clay loam; very strongly acid

Latex

Surface layer:

0 to 4 inches—brown fine sandy loam; strongly acid

Subsurface layer:

4 to 14 inches—light yellowish brown fine sandy loam; strongly acid

Subsoil:

14 to 20 inches—yellowish brown loam; very strongly acid

20 to 31 inches—strong brown sandy clay loam; very strongly acid

31 to 35 inches—yellowish brown clay loam; very strongly acid

35 to 39 inches—red, pale brown, and yellowish brown clay loam; very strongly acid

39 to 80 inches—strong brown, light brownish gray, and red clay; very strongly acid

Contrasting Inclusions

- Metcalf soils, which occur in depressional areas and small drains and are wetter in the upper part

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Groups 1 and 7, which are described in the section “Use and Management of the Soils.”
- These soils are well suited to pasture.

Woodland

- See Woodland Management Groups 7 and 14, which are described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the content of clay, the soil becomes sticky when wet. The stickiness increases the cost of constructing haul roads and log landings.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- Because of shrinking and swelling, these soils may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

GaA—Gallime-Guyton complex, 0 to 2 percent slopes, mounded

Map Unit Composition

Major components:

Gallime and similar soils—46 to 50 percent

Guyton and similar soils—40 to 44 percent

Contrasting inclusions:

Metcalf soils—0 to 20 percent

Component Descriptions

Gallime

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Mound on stream terrace

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 1 to 3 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.6 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 48 to 72 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 2e

Guyton

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Open depression on stream terrace

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Soil Survey of Shelby County, Texas

Drainage class: Poorly drained
Slowest permeability: Slow (about 0.06 in/hr)
Available water capacity: Low (about 4.6 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 0 to 18 inches
Runoff class: Negligible
Land capability classification (non-irrigated): 3w

Typical Profile

Gallime

Surface layer:
0 to 8 inches—brown very fine sandy loam; very strongly acid
Subsurface layer:
8 to 16 inches—yellowish brown very fine sandy loam; very strongly acid
16 to 27 inches—light yellowish brown very fine sandy loam; very strongly acid

Subsoil:
27 to 34 inches—yellowish red sandy clay loam; very strongly acid
34 to 45 inches—yellowish red sandy clay loam; very strongly acid
45 to 56 inches—yellowish red sandy clay loam; very strongly acid
56 to 66 inches—yellowish red and strong brown sandy clay loam; very strongly acid
66 to 88 inches—yellowish brown and yellowish red sandy clay loam; very strongly acid
88 to 128 inches—yellowish brown very fine sandy loam; very strongly acid

Guyton

Surface layer:
0 to 5 inches—brown silt loam; strongly acid
Subsurface layer:
5 to 11 inches—light brownish gray silt loam; very strongly acid
11 to 26 inches—40 percent grayish brown and 60 percent light gray silt loam; very strongly acid

Subsoil:
26 to 42 inches—light brownish gray silt loam; very strongly acid
42 to 49 inches—light brownish gray loam; very strongly acid
49 to 64 inches—light gray silt loam; very strongly acid
64 to 80 inches—light gray silt loam; very strongly acid

Contrasting Inclusions

- Metcalf soils, which are somewhat poorly drained and are in intermound positions

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See Pasture Management Groups 1 and 10, which are described in the section “Use and Management of the Soils.”
- These soils are well suited to pasture.

Woodland

- See Woodland Management Groups 7 and 17, which are described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.

Septic tank absorption fields

- The restricted permeability and the seasonal high water table limit the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, these soils may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

GaB—Gallime very fine sandy loam, 1 to 3 percent slopes

Map Unit Composition

Major components:

Gallime and similar soils—80 to 100 percent

Contrasting inclusions:

Guyton soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 1 to 3 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.6 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 48 to 72 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 2e

Typical Profile

Surface layer:

0 to 3 inches—brown very fine sandy loam; very strongly acid

Subsurface layer:

3 to 12 inches—light yellowish brown fine sandy loam; very strongly acid

12 to 20 inches—light yellowish brown fine sandy loam; strongly acid

Subsoil:

20 to 24 inches—strong brown and light yellowish brown loam; strongly acid

24 to 43 inches—strong brown sandy clay loam; strongly acid

43 to 80 inches—strong brown clay loam; strongly acid

Contrasting Inclusions

- Guyton soils, which are gray throughout and are in closed depressions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- This soil is well suited to pasture.

Woodland

- See Woodland Management Group 7, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.

Septic tank absorption fields

- The restricted permeability and the seasonal high water table limit the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.

GrB—Grapeland loamy fine sand, 1 to 5 percent slopes

Map Unit Composition

Major components:

Grapeland and similar soils—100 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Broad interstream divide on coastal plain

Hillslope position: None

Parent material: Sandy marine sediments

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat excessively drained

Slowest permeability: Rapid (about 5.95 in/hr)

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Negligible

Land capability classification (non-irrigated): 3s

Typical Profile

Surface layer:

0 to 6 inches—brown loamy fine sand; strongly acid

Subsoil:

6 to 30 inches—yellowish red loamy fine sand; very strongly acid

30 to 68 inches—yellowish red loamy fine sand; very strongly acid

68 to 80 inches—yellowish red loamy fine sand; very strongly acid

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 5, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 13, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Sandy layers increase the maintenance of haul roads and log landings.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- This soil is well suited to building site development.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.

Local roads and streets

- This soil is well suited to local roads and streets.

GtA—Guyton silt loam, ponded

Map Unit Composition

Major components:

Guyton and similar soils—85 to 100 percent

Contrasting inclusions:

Cart soils—0 to 10 percent

Timpson soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Closed depression on stream terrace

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Very poorly drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 4.7 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: Frequent

Ponding hazard: Frequent

Depth to seasonal water saturation: About 0 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 7w

Typical Profile

Surface layer:

0 to 2 inches—dark grayish brown silt loam; very strongly acid

Subsurface layer:

2 to 9 inches—light brownish gray silt loam; very strongly acid

9 to 15 inches—light brownish gray silt loam; strongly acid

Subsoil:

15 to 29 inches—grayish brown silty clay loam; extremely acid

29 to 43 inches—grayish brown silty clay loam; very strongly acid

43 to 59 inches—grayish brown clay loam; very strongly acid

59 to 80 inches—light brownish gray clay loam; very strongly acid

Contrasting Inclusions

- Cart soils, which are well drained and occur on mounds
- Timpson soils, which are moderately well drained and occur on mounds

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Woodland

- See Woodland Management Group 17, which is described in the section “Use and Management of the Soils.”
- A seasonal high water table and standing water can inhibit the growth of some species of seedlings by reducing root respiration.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Soil wetness may limit the use of log trucks.
- Flooding and ponding restrict the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The frequent flooding greatly increases the risk of damage associated with floodwaters. Because of the flooding, this soil is generally unsuited to building site development.
- Because water tends to pond on the soil, the period when excavations can be made may be restricted and intensive construction site development and building maintenance may be needed. The soil is generally unsuited to building site development.

Septic tank absorption fields

- This soil is generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.
- Because of the ponding, this soil is generally unsuited to septic tank absorption fields.

Local roads and streets

- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Special design of roads and bridges is needed to prevent the damage caused by flooding.

HaB—Hainesville fine sand, 0 to 2 percent slopes

Map Unit Composition

Major components:

Hainesville and similar soils—80 to 100 percent

Contrasting inclusions:

Austonio soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Stream terrace on coastal plain

Hillslope position: None

Parent material: Sandy alluvium

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat excessively drained

Slowest permeability: Rapid (about 5.95 in/hr)

Available water capacity: Very low (about 1.6 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Negligible

Land capability classification (non-irrigated): 3s

Typical Profile

Surface layer:

0 to 7 inches—brown fine sand; very strongly acid

Subsurface layer:

7 to 23 inches—yellowish brown fine sand; very strongly acid

23 to 45 inches—light yellowish brown fine sand; very strongly acid

Subsoil:

45 to 65 inches—brownish yellow fine sand; very strongly acid

65 to 80 inches—brownish yellow fine sand; very strongly acid

Contrasting Inclusions

- Austonio soils, which are loamy throughout and are on side slopes

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 5, which is described in the section “Use and Management of the Soils.”
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 4, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Sandy layers increase the maintenance of haul roads and log landings.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- This soil is well suited to building site development.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.

Local roads and streets

- This soil is well suited to local roads and streets.

lu—lulus soils, frequently flooded

Map Unit Composition

Major components:

lulus and similar soils—0 to 90 percent

Contrasting inclusions:

Gray, wet soils—0 to 20 percent

Owentown soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Stratified loamy and sandy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Soil Survey of Shelby County, Texas

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.5 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: Frequent

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 48 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 5w

Typical Profile

Surface layer:

0 to 4 inches—dark yellowish brown fine sandy loam; very strongly acid

Subsoil:

4 to 18 inches—yellowish brown fine sandy loam; very strongly acid

18 to 24 inches—brown loamy fine sand; very strongly acid

24 to 35 inches—light brownish gray fine sandy loam; very strongly acid

35 to 44 inches—light brownish gray fine sandy loam; very strongly acid

44 to 80 inches—light brownish gray and yellowish brown fine sandy loam; strongly acid

Contrasting Inclusions

- Gray, wet soils, which are hydric and occur in low areas
- Owentown soils, which are in occasionally flooded positions

Use and Management

Major land uses: Most areas are used for wildlife habitat or recreation

Woodland

- See Woodland Management Group 2, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Flooding restricts the safe use of roads by log trucks.
- Uncontrolled burning may destroy organic matter.

Building sites

- The frequent flooding greatly increases the risk of damage associated with floodwaters. Because of the flooding, these soils are generally unsuited to building site development.

Septic tank absorption fields

- These soils are generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.

Local roads and streets

- Special design of roads and bridges is needed to prevent the damage caused by flooding.

KfC—Kirvin fine sandy loam, 1 to 5 percent slopes

Map Unit Composition

Major components:

Kirvin and similar soils—90 to 100 percent

Contrasting inclusions:

Bowie soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Ridge on coastal plain

Hillslope position: Convex

Parent material: Interbedded sandstone and shale

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 6 inches—brown fine sandy loam; very strongly acid

Subsurface layer:

6 to 12 inches—light brown fine sandy loam; very strongly acid

Subsoil:

12 to 18 inches—red clay; very strongly acid

18 to 28 inches—red clay; very strongly acid

28 to 41 inches—red clay; very strongly acid

41 to 43 inches—red fine sandy loam; very strongly acid

Substratum:

43 to 48 inches—strong brown and dusky red weathered bedrock; extremely acid

48 to 57 inches—light brownish gray and dusky red weathered bedrock; extremely acid

57 to 80 inches—dark red and red weathered bedrock; extremely acid

Contrasting Inclusions

- Bowie soils, which are very deep and are loamy throughout

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 7, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 10, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

KgC—Kirvin gravelly fine sandy loam, 1 to 5 percent slopes

Map Unit Composition

Major components:

Kirvin and similar soils—80 to 100 percent

Contrasting inclusions:

Bowie soils—0 to 10 percent

Lilbert soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Ridge on coastal plain

Soil Survey of Shelby County, Texas

Hillslope position: None

Parent material: Interbedded sandstone and shale

Slope range: 1 to 5 percent

Surface fragments: About 0.00 to 0.10 percent coarse subrounded gravel

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.7 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Medium

Land capability classification (non-irrigated): 4e

Typical Profile

Surface layer:

0 to 2 inches—brown gravelly fine sandy loam; very strongly acid

Subsurface layer:

2 to 9 inches—brown gravelly fine sandy loam; very strongly acid

Subsoil:

9 to 21 inches—red clay; very strongly acid

21 to 25 inches—red clay; moderately acid

25 to 41 inches—yellowish red clay; strongly acid

41 to 55 inches—red sandy clay loam; very strongly acid

55 to 80 inches—red sandy clay loam; strongly acid

Contrasting Inclusions

- Bowie soils, which are very deep and are loamy throughout
- Lilbert soils, which are very deep and have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 7, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 15, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Rock fragments obstruct the use of mechanical planting equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

KsC—Kirvin soils, 1 to 5 percent slopes, graded

Map Unit Composition

Major components:

Kirvin and similar soils—90 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Ridge on coastal plain

Hillslope position: None

Parent material: Interbedded sandstone and shale

Slope range: 1 to 5 percent

Surface fragments: About 0.00 to 0.10 percent coarse subrounded gravel

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.4 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 6 inches—yellowish red clay loam; very strongly acid

Subsoil:

6 to 24 inches—brownish yellow and dark red clay loam; very strongly acid

24 to 35 inches—light gray, brownish yellow, and dark red clay loam; very strongly acid
35 to 47 inches—light gray clay loam; very strongly acid

Substratum:

47 to 80 inches—light gray clay loam; very strongly acid

Contrasting Inclusions

- Tenaha soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 12, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 18, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the content of clay, the soil becomes sticky when wet. The stickiness increases the cost of constructing haul roads and log landings.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, these soils may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

La—Laneville silt loam, occasionally flooded

Map Unit Composition

Major components:

Laneville and similar soils—70 to 100 percent

Contrasting inclusions:

Dreka soils—0 to 30 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Loamy and clayey alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.5 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: Occasional

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 36 inches

Runoff class: Very low

Land capability classification (non-irrigated): 2w

Typical Profile

Surface layer:

0 to 8 inches—dark brown silt loam; very strongly acid

Subsoil:

8 to 18 inches—brown silt loam; extremely acid

18 to 35 inches—grayish brown and yellowish brown silty clay loam; extremely acid

35 to 43 inches—grayish brown clay loam; extremely acid

43 to 64 inches—gray clay; extremely acid

64 to 80 inches—grayish brown and yellowish brown clay loam; very strongly acid

Contrasting Inclusions

- Dreka soils, which are gray throughout and are in meander scars and sloughs

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 2, which is described in the section “Use and Management of the Soils.”
- Forage production can be improved by seeding grass-legume mixtures that are tolerant of flooding.
- Sediment left on forage plants after a flood event may reduce palatability and forage intake by the grazing animal.

Woodland

- See Woodland Management Group 2, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Flooding restricts the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.

Building sites

- Under normal weather conditions, this soil is subject to occasional flooding. The flooding may result in physical damage and costly repairs to buildings.
- This soil is generally unsuited to homesites. Special design of some structures, such as farm outbuildings, may be needed to prevent the damage caused by flooding.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- This soil is generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Special design of roads and bridges is needed to prevent the damage caused by flooding.

Lf—Laneville loam, 0 to 1 percent slopes, frequently flooded

Map Unit Composition

Major components:

Laneville and similar soils—60 to 100 percent

Contrasting inclusions:

Dreka soils—0 to 20 percent

Occasionally flooded Laneville soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Soil Survey of Shelby County, Texas

Parent material: Loamy and clayey alluvium
Slope range: 0 to 1 percent
Surface fragments: None
Depth to restrictive feature: None
Drainage class: Moderately well drained
Slowest permeability: Slow (about 0.06 in/hr)
Available water capacity: Low (about 3.4 inches)
Shrink-swell potential: High (about 7.5 LEP)
Flooding hazard: Frequent
Ponding hazard: None
Depth to seasonal water saturation: About 18 to 36 inches
Runoff class: Very low
Land capability classification (non-irrigated): 5w

Typical Profile

Surface layer:
0 to 7 inches—brown loam; very strongly acid

Subsoil:
7 to 10 inches—yellowish brown, grayish brown, and dark yellowish brown loam; very strongly acid
10 to 24 inches—yellowish brown, dark yellowish brown, and grayish brown silt loam; very strongly acid
24 to 35 inches—grayish brown clay loam; very strongly acid
35 to 45 inches—grayish brown clay; very strongly acid
45 to 80 inches—grayish brown clay; very strongly acid

Contrasting Inclusions

- Dreka soils, which are gray throughout and are in low areas
- Laneville soils, which are in occasionally flooded positions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 2, which is described in the section “Use and Management of the Soils.”
- Forage production can be improved by seeding grass-legume mixtures that are tolerant of flooding.
- Sediment left on forage plants after a flood event may reduce palatability and forage intake by the grazing animal.

Woodland

- See Woodland Management Group 2, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Flooding restricts the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.

Building sites

- The frequent flooding greatly increases the risk of damage associated with floodwaters. Because of the flooding, this soil is generally unsuited to building site development.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- This soil is generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.

Local roads and streets

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Special design of roads and bridges is needed to prevent the damage caused by flooding.

LtB—Latex fine sandy loam, 1 to 3 percent slopes

Map Unit Composition

Major components:

Latex and similar soils—40 to 100 percent

Contrasting inclusions:

Eastwood soils—0 to 20 percent

Metcalf soils—0 to 20 percent

Tenaha soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Marine terrace on coastal plain

Hillslope position: None

Parent material: Loamy over clayey sediments

Slope range: 1 to 3 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.6 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 36 to 54 inches

Runoff class: Unspecified

Land capability classification (non-irrigated): 2e

Typical Profile

Surface layer:

0 to 7 inches—brown fine sandy loam; moderately acid

Subsurface layer:

7 to 11 inches—brown very fine sandy loam; moderately acid

Subsoil:

11 to 22 inches—strong brown loam; strongly acid

22 to 30 inches—strong brown sandy clay loam; very strongly acid

30 to 40 inches—reddish yellow loam; very strongly acid

40 to 55 inches—brownish yellow loam; very strongly acid

55 to 58 inches—red clay loam; very strongly acid

58 to 80 inches—dark red and light brownish gray clay; very strongly acid

Contrasting Inclusions

- Eastwood soils, which are clayey near the surface and are in landform positions similar to those of the Latex soils or are in the more sloping areas
- Metcalf soils, which are somewhat poorly drained and are in low, wet areas
- Tenaha soils, which have sandy surface and subsurface layers that range from 20 to 40 inches in thickness

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- This soil is well suited to pasture.

Woodland

- See Woodland Management Group 7, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.

- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.

LuC—Lilbert loamy fine sand, 1 to 5 percent slopes

Map Unit Composition

Major components:

Lilbert and similar soils—80 to 100 percent

Contrasting inclusions:

Bowie soils—0 to 10 percent

Kirvin soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Interfluvium on coastal plain

Hillslope position: None

Parent material: Sandy and loamy sediments

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.4 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 6 inches—brown loamy fine sand; strongly acid

Subsurface layer:

6 to 31 inches—light yellowish brown loamy fine sand; very strongly acid

Subsoil:

31 to 39 inches—yellowish brown sandy clay loam; strongly acid

39 to 48 inches—yellowish brown sandy clay loam; strongly acid

48 to 58 inches—yellowish brown sandy clay loam; very strongly acid

58 to 66 inches—yellowish brown sandy clay loam; very strongly acid

66 to 80 inches—reddish yellow sandy clay loam; very strongly acid

Contrasting Inclusions

- Bowie soils, which are loamy throughout
- Kirvin soils, which have a clayey subsoil and may have a gravelly surface layer in some areas

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 6, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 8, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Sandy layers increase the maintenance of haul roads and log landings.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- This soil is well suited to building site development.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.

Local roads and streets

- This soil is well suited to local roads and streets.

MaE—Maben fine sandy loam, 5 to 15 percent slopes

Map Unit Composition

Major components:

Maben and similar soils—80 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Convex

Parent material: Loamy and clayey material over shale

Slope range: 5 to 15 percent

Surface fragments: None

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 1.5 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: High

Land capability classification (non-irrigated): 4e

Typical Profile

Surface layer:

0 to 4 inches—brown fine sandy loam; very strongly acid

Subsoil:

4 to 14 inches—yellowish red clay loam; very strongly acid

14 to 24 inches—yellowish red clay loam; very strongly acid

24 to 28 inches—reddish brown and yellowish brown silty clay loam; very strongly acid

Substratum:

28 to 38 inches—strong brown, light yellowish brown, yellowish brown, and light brownish gray silt loam; very strongly acid

38 to 80 inches—light brownish gray and light reddish brown weathered bedrock; very strongly acid

Contrasting Inclusions

- Tenaha soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See Pasture Management Group 9, which is described in the section “Use and Management of the Soils.”
- Avoiding overgrazing can reduce the hazard of erosion.
- Maintaining healthy plants and vegetative cover can reduce the hazard of erosion.
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.
- The rooting depth of plants may be restricted by a dense soil layer.

Woodland

- See Woodland Management Group 16, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines and seepage of poorly treated effluent is a concern.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

MaG—Maben fine sandy loam, 15 to 35 percent slopes

Map Unit Composition

Major components:

Maben and similar soils—80 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Linear

Parent material: Loamy and clayey material over shale

Slope range: 15 to 35 percent

Surface fragments: None

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 1.9 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: High

Land capability classification (non-irrigated): 7e

Typical Profile

Surface layer:

0 to 3 inches—brown fine sandy loam; strongly acid

Subsoil:

3 to 12 inches—yellowish red clay loam; very strongly acid

12 to 21 inches—yellowish red silty clay; very strongly acid

21 to 25 inches—pale brown silty clay; very strongly acid

Substratum:

25 to 30 inches—brown clay; very strongly acid

30 to 38 inches—brown weathered bedrock; very strongly acid

38 to 60 inches—brown and strong brown weathered bedrock; very strongly acid

Contrasting Inclusions

- Tenaha soils, which have sandy surface and subsurface layers that are 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production

Woodland

- See Woodland Management Group 11, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The slope increases excavation costs, poses safety hazards, and creates a potential for erosion during the construction of haul roads and log landings.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks and harvesting and mechanical planting equipment.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- Because of the slope, the use of mechanical planting equipment is not practical.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- The slope restricts the use of equipment for preparing sites for planting and seeding.
- Uncontrolled burning may destroy organic matter.

Building sites

- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs are required to ensure satisfactory performance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

McA—Metcalf very fine sandy loam, 0 to 2 percent slopes

Map Unit Composition

Major components:

Metcalf and similar soils—60 to 100 percent

Contrasting inclusions:

Sawtown soils—0 to 20 percent

Guyton soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Marine terrace on coastal plain

Hillslope position: None

Parent material: Loamy over clayey deposits

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat poorly drained

Slowest permeability: Impermeable (about 0.00 in/hr)

Available water capacity: Low (about 4.0 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 30 inches

Runoff class: High

Land capability classification (non-irrigated): 2w

Typical Profile

Surface layer:

0 to 10 inches—brown very fine sandy loam; extremely acid

Subsoil:

10 to 19 inches—brownish yellow loam; extremely acid

19 to 26 inches—light yellowish brown and brownish yellow clay loam; very strongly acid

26 to 36 inches—light yellowish brown clay loam; extremely acid

36 to 61 inches—gray and red clay; extremely acid

61 to 80 inches—gray clay; extremely acid

Contrasting Inclusions

- Sawtown soils, which are well drained and are on mounds
- Guyton soils, which are gray throughout and are in closed depressions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- Excess water should be removed, or grass or legume species that are adapted to wet soil conditions should be planted.

Woodland

- See Woodland Management Group 9, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. This soil is poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.
- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy

loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

MeA—Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded

Map Unit Composition

Major components:

Metcalf and similar soils—40 to 55 percent

Sawtown and similar soils—30 to 40 percent

Contrasting inclusions:

Eastwood soils—0 to 20 percent

Wet, gray, clayey soils—0 to 20 percent

Component Descriptions

Metcalf

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Marine terrace on coastal plain

Hillslope position: None

Parent material: Loamy sediments over clayey deposits

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat poorly drained

Slowest permeability: Impermeable (about 0.00 in/hr)

Available water capacity: Low (about 4.1 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 30 inches

Runoff class: Medium

Land capability classification (non-irrigated): 2w

Sawtown

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Circular to elongated mound on marine terrace

Hillslope position: None

Parent material: Loamy over clayey deposits

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Very slow (about 0.00 in/hr)

Available water capacity: Low (about 3.3 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 36 to 54 inches

Runoff class: Low

Land capability classification (non-irrigated): 2e

Typical Profile

Metcalf

Surface layer:

0 to 7 inches—dark grayish brown very fine sandy loam; very strongly acid

Subsurface layer:

7 to 11 inches—40 percent brownish yellow and 60 percent pale brown loam; extremely acid

Subsoil:

11 to 17 inches—brownish yellow loam; very strongly acid

17 to 35 inches—pale brown loam; strongly acid

35 to 80 inches—red, gray, and yellowish brown clay; strongly acid

Sawtown

Surface layer:

0 to 11 inches—brown very fine sandy loam; very strongly acid

Subsurface layer:

11 to 25 inches—pale brown very fine sandy loam; strongly acid

25 to 30 inches—pale brown very fine sandy loam; strongly acid

Subsoil:

30 to 37 inches—yellowish brown loam; very strongly acid

37 to 49 inches—brownish yellow loam; very strongly acid

49 to 80 inches—gray clay loam; very strongly acid

Contrasting Inclusions

- Eastwood soils, which are clayey near the surface
- Wet, gray, clayey soils, which are hydric and occur in flats and closed depressions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- Excess water should be removed, or grass or legume species that are adapted to wet soil conditions should be planted.

Woodland

- See Woodland Management Groups 7 and 9, which are described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required.
- These soils are poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.
- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

MfA—Metcalf-Timpson complex, 0 to 2 percent slopes, mounded

Map Unit Composition

Major components:

Metcalf and similar soils—50 to 60 percent

Timpson and similar soils—30 to 40 percent

Contrasting inclusions:

Guyton soils—0 to 20 percent

Component Descriptions

Metcalf

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Marine terrace on coastal plain and stream terrace on coastal plain

Hillslope position: None

Parent material: Loamy over clayey deposits

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Somewhat poorly drained

Slowest permeability: Impermeable (about 0.00 in/hr)

Available water capacity: Low (about 4.0 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Soil Survey of Shelby County, Texas

Depth to seasonal water saturation: About 18 to 30 inches

Runoff class: High

Land capability classification (non-irrigated): 2w

Timpson

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Mound on stream terrace and mound on marine terrace

Hillslope position: None

Parent material: Loamy over clayey deposits

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Low (about 4.0 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 30 to 42 inches

Runoff class: Low

Land capability classification (non-irrigated): 2w

Typical Profile

Metcalf

Surface layer:

0 to 7 inches—dark grayish brown very fine sandy loam; very strongly acid

Subsurface layer:

7 to 11 inches—40 percent brownish yellow and 60 percent pale brown loam; extremely acid

Subsoil:

11 to 17 inches—brownish yellow loam; very strongly acid

17 to 35 inches—pale brown loam; strongly acid

35 to 80 inches—red, gray, and yellowish brown clay; strongly acid

Timpson

Surface layer:

0 to 7 inches—dark grayish brown silt loam; strongly acid

Subsurface layer:

7 to 13 inches—yellowish brown very fine sandy loam; very strongly acid

Subsoil:

13 to 20 inches—strong brown very fine sandy loam; extremely acid

20 to 27 inches—strong brown loam; very strongly acid

27 to 34 inches—strong brown loam; very strongly acid

34 to 43 inches—yellowish brown loam; very strongly acid

43 to 52 inches—light yellowish brown loam; very strongly acid

52 to 55 inches—light brownish gray clay loam; very strongly acid

55 to 61 inches—gray clay loam; very strongly acid

61 to 73 inches—light brownish gray clay loam; very strongly acid

73 to 80 inches—strong brown sandy clay loam; very strongly acid

Contrasting Inclusions

- Guyton soils, which are gray throughout and are in closed depressions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- Excess water should be removed, or grass or legume species that are adapted to wet soil conditions should be planted.
- Restricting grazing during wet periods can minimize compaction.

Woodland

- See Woodland Management Groups 7 and 9, which are described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required.
- These soils are poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.
- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

MhC—Meth fine sandy loam, 1 to 5 percent slopes

Map Unit Composition

Major components:

Meth and similar soils—60 to 100 percent

Contrasting inclusions:

Tenaha soils—0 to 40 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Ridge on coastal plain

Hillslope position: None

Parent material: Loamy and clayey marine sediment

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Low (about 3.6 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 4 inches—dark grayish brown fine sandy loam; moderately acid

Subsurface layer:

4 to 8 inches—brown fine sandy loam; moderately acid

Subsoil:

8 to 21 inches—red clay; strongly acid

21 to 30 inches—red clay; strongly acid

30 to 43 inches—red sandy clay loam; very strongly acid

43 to 54 inches—red sandy clay loam; very strongly acid

54 to 69 inches—red sandy clay loam; very strongly acid

69 to 85 inches—yellowish red fine sandy loam; very strongly acid

Contrasting Inclusions

- Tenaha soils, which have a sandy surface layer that is 20 to 40 inches thick

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 7, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 10, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.

Building sites

- This soil is well suited to building site development.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

MpA—Mollville-Besner complex, 0 to 3 percent slopes, mounded

Map Unit Composition

Major components:

Mollville and similar soils—50 to 70 percent

Besner and similar soils—30 to 40 percent

Contrasting inclusions:

Hainesville soils—0 to 10 percent

Component Descriptions

Mollville

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Open depression on stream terrace

Hillslope position: None

Parent material: Stratified loamy and sandy sediments

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Poorly drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Low (about 3.7 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Soil Survey of Shelby County, Texas

Flooding hazard: None
Ponding hazard: Frequent
Depth to seasonal water saturation: About 0 inches
Runoff class: Unspecified
Land capability classification (non-irrigated): 4w

Besner

Major Land Resource Area: Western Coastal Plain (133B)
Landform: Mound on stream terrace
Hillslope position: None
Parent material: Loamy alluvium
Slope range: 0 to 3 percent
Surface fragments: None
Depth to restrictive feature: None
Drainage class: Well drained
Slowest permeability: Moderate (about 0.57 in/hr)
Available water capacity: Low (about 3.4 inches)
Shrink-swell potential: Low (about 1.5 LEP)
Flooding hazard: None
Ponding hazard: None
Depth to seasonal water saturation: About 40 to 60 inches
Runoff class: Unspecified
Land capability classification (non-irrigated): 2e

Typical Profile

Mollville

Surface layer:
0 to 5 inches—dark grayish brown loam; very strongly acid
Subsurface layer:
5 to 9 inches—gray loam; very strongly acid
Subsoil:
9 to 17 inches—grayish brown clay loam; very strongly acid
17 to 35 inches—grayish brown clay loam; moderately acid
35 to 57 inches—grayish brown clay loam; moderately acid
57 to 76 inches—grayish brown loam; slightly alkaline
Substratum:
76 to 80 inches—grayish brown fine sandy loam; slightly alkaline

Besner

Surface layer:
0 to 7 inches—brown fine sandy loam; moderately acid
Subsurface layer:
7 to 21 inches—very pale brown fine sandy loam; strongly acid
21 to 39 inches—20 percent brownish yellow and 80 percent light yellowish brown fine sandy loam; strongly acid
39 to 46 inches—30 percent yellow and 70 percent light yellowish brown fine sandy loam; strongly acid
Subsoil:
46 to 68 inches—brownish yellow loam; very strongly acid
68 to 80 inches—brownish yellow loam; very strongly acid

Contrasting Inclusions

- Hainesville soils, which are sandy throughout and are in the slightly higher areas

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture

Pastureland

- See Pasture Management Groups 1 and 10, which are described in the section “Use and Management of the Soils.”
- Excess water should be removed, or grass or legume species that are adapted to wet soil conditions should be planted.

Woodland

- See Woodland Management Groups 7 and 17, which are described in the section “Use and Management of the Soils.”
- A seasonal high water table can inhibit the growth of some species of seedlings by reducing root respiration.
- Standing water can inhibit the growth of some species of seedlings by restricting root respiration.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Soil wetness may limit the use of log trucks.
- Ponding restricts the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- A loss of soil productivity may occur following an episode of uncontrolled fire.
- Uncontrolled burning may destroy organic matter.

Building sites

- Because water tends to pond on the soil, the period when excavations can be made may be restricted and intensive construction site development and building maintenance may be needed.
- These soils are generally unsuited to building site development.

Septic tank absorption fields

- Because of the ponding, these soils are generally unsuited to septic tank absorption fields.

Local roads and streets

- Ponding affects the ease of excavation and grading and limits the bearing capacity of the soil.
- Because of shrinking and swelling, these soils may not be suitable for use as base material for local roads and streets.
- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.

Ow—Owentown fine sandy loam, 0 to 1 percent slopes, occasionally flooded

Map Unit Composition

Major components:

Owentown and similar soils—70 to 100 percent

Contrasting inclusions:

Gray, wet soils—0 to 30 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.3 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: Occasional

Ponding hazard: None

Depth to seasonal water saturation: About 30 to 48 inches

Runoff class: Unspecified

Land capability classification (non-irrigated): 2w

Typical Profile

Surface layer:

0 to 3 inches—brown fine sandy loam; strongly acid

Subsoil:

3 to 13 inches—yellowish brown fine sandy loam; strongly acid

13 to 29 inches—brownish yellow fine sandy loam; moderately acid

29 to 43 inches—brownish yellow fine sandy loam; moderately acid

43 to 66 inches—light yellowish brown fine sandy loam; moderately acid

66 to 80 inches—yellowish brown fine sandy loam; moderately acid

Contrasting Inclusions

- Gray, wet soils

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 2, which is described in the section “Use and Management of the Soils.”
- Forage production can be improved by seeding grass-legume mixtures that are tolerant of flooding.
- Sediment left on forage plants after a flood event may reduce palatability and forage intake by the grazing animal.

Woodland

- See Woodland Management Group 1, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Flooding restricts the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- Uncontrolled burning may destroy organic matter.

Building sites

- Under normal weather conditions, this soil is subject to occasional flooding. The flooding may result in physical damage and costly repairs to buildings.
- This soil is generally unsuited to homesites. Special design of some structures, such as farm outbuildings, may be needed to prevent the damage caused by flooding.

Septic tank absorption fields

- This soil is generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.

Local roads and streets

- Special design of roads and bridges is needed to prevent the damage caused by flooding.

Ox—Owentown fine sandy loam, 0 to 1 percent slopes, frequently flooded

Map Unit Composition

Major components:

Owentown and similar soils—80 to 95 percent

Contrasting inclusions:

Gray, wet soils—0 to 10 percent

Occasionally flooded Owentown soils—0 to 10 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Flood plain on coastal plain

Hillslope position: None

Parent material: Loamy alluvium

Slope range: 0 to 1 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Moderate (about 0.57 in/hr)

Available water capacity: Low (about 3.2 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Soil Survey of Shelby County, Texas

Flooding hazard: Frequent

Ponding hazard: None

Depth to seasonal water saturation: About 30 to 48 inches

Runoff class: Negligible

Land capability classification (non-irrigated): 5w

Typical Profile

Surface layer:

0 to 6 inches—brown fine sandy loam; strongly acid

Subsoil:

6 to 29 inches—light yellowish brown fine sandy loam; strongly acid

29 to 35 inches—light yellowish brown fine sandy loam; strongly acid

35 to 45 inches—light yellowish brown fine sandy loam; strongly acid

45 to 59 inches—light brownish gray loam; strongly acid

59 to 80 inches—light yellowish brown and light gray fine sandy loam; strongly acid

Contrasting Inclusions

- Gray, wet soils
- Owentown soils, which are in occasionally flooded areas

Use and Management

Major land uses: Most areas are used for wildlife habitat and recreational uses

Pastureland

- See Pasture Management Group 2, which is described in the section “Use and Management of the Soils.”
- Forage production can be improved by seeding grass-legume mixtures that are tolerant of flooding.
- Sediment left on forage plants after a flood event may reduce palatability and forage intake by the grazing animal.

Woodland

- See Woodland Management Group 1, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Flooding may result in damage to haul roads and increased maintenance costs.
- Flooding restricts the safe use of roads by log trucks.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- Uncontrolled burning may destroy organic matter.

Building sites

- The frequent flooding greatly increases the risk of damage associated with floodwaters. Because of the flooding, this soil is generally unsuited to building site development.

Septic tank absorption fields

- This soil is generally unsuited to septic tank absorption fields. The flooding greatly limits the absorption and proper treatment of the effluent from septic systems.
- Rapidly moving floodwaters may damage some components of septic systems.

Local roads and streets

- Special design of roads and bridges is needed to prevent the damage caused by flooding.

RnB—Rentzel loamy fine sand, 0 to 5 percent slopes

Map Unit Composition

Major components:

Rentzel and similar soils—40 to 100 percent

Contrasting inclusions:

lulus soils—0 to 20 percent

Gray, wet, sandy soils—0 to 20 percent

Sacul soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Concave

Parent material: Sandy and loamy marine deposits

Slope range: 0 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.5 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 18 to 36 inches

Runoff class: Low

Land capability classification (non-irrigated): 3w

Typical Profile

Surface layer:

0 to 9 inches—grayish brown loamy fine sand; extremely acid

Subsurface layer:

9 to 24 inches—light yellowish brown loamy fine sand; very strongly acid

Subsoil:

24 to 28 inches—brownish yellow fine sandy loam; extremely acid

28 to 35 inches—brownish yellow sandy clay loam; very strongly acid

35 to 48 inches—brownish yellow sandy clay loam; very strongly acid

48 to 57 inches—brownish yellow sandy clay loam; very strongly acid

57 to 80 inches—red, brownish yellow, and light brownish gray sandy clay loam; extremely acid

Contrasting Inclusions

- lulus soils, which are on flood plains
- Gray, wet soils that are sandy throughout and are on toeslopes
- Sacul soils, which are clayey near the surface and are at the heads of drains

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 5, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 5, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- Sandy layers increase the maintenance of haul roads and log landings.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- A loss of soil productivity may occur following an episode of uncontrolled fire.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required.
- This soil is poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- The seasonal high water table affects the ease of excavation and grading and reduces the bearing capacity of the soil.

SaC—Sacul fine sandy loam, 1 to 5 percent slopes

Map Unit Composition

Major components:

Sacul and similar soils—80 to 100 percent

Contrasting inclusions:

Bowie soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Interfluvium on coastal plain

Soil Survey of Shelby County, Texas

Hillslope position: None

Parent material: Loamy and clayey marine sediments

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Moderately well drained

Slowest permeability: Slow (about 0.06 in/hr)

Available water capacity: Very low (about 3.0 inches)

Shrink-swell potential: High (about 7.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 24 to 48 inches

Runoff class: High

Land capability classification (non-irrigated): 4e

Typical Profile

Surface layer:

0 to 7 inches—brown fine sandy loam; strongly acid

Subsurface layer:

7 to 12 inches—brown fine sandy loam; strongly acid

Subsoil:

12 to 20 inches—red clay; extremely acid

20 to 28 inches—red clay; very strongly acid

28 to 31 inches—30 percent brownish yellow, 30 percent light brownish gray, and 40 percent dark red clay; very strongly acid

31 to 43 inches—light brownish gray clay; strongly acid

43 to 49 inches—light brownish gray sandy clay loam; extremely acid

Substratum:

49 to 80 inches—30 percent brownish yellow, 35 percent gray, and 35 percent light brownish gray sandy clay loam; very strongly acid

Contrasting Inclusions

- Bowie soils, which are moderately drained, are loamy throughout, and occur in the slightly higher positions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 7, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.

Woodland

- See Woodland Management Group 9, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The stickiness of the soil reduces the efficiency of mechanical planting equipment.
- Because of the stickiness of the soil, the use of equipment for site preparation is restricted to the drier periods.

Building sites

- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required.
- This soil is poorly suited to building site development, and structures may need special design in order to prevent damage from wetness.
- Severe shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures generally require special design and construction techniques or intensive maintenance.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- Because of shrinking and swelling, this soil may not be suitable for use as base material for local roads and streets.
- The low bearing strength of the soil is generally unfavorable for supporting heavy loads. Special design of local roads and streets is needed to prevent the structural damage caused by the low soil strength.

SfA—Sawtown very fine sandy loam, 0 to 2 percent slopes

Map Unit Composition

Major components:

Sawtown and similar soils—60 to 100 percent

Contrasting inclusions:

Metcalf soils—0 to 20 percent

Guyton soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Marine terrace on coastal plain

Hillslope position: None

Parent material: Loamy and clayey deposits

Slope range: 0 to 2 percent

Surface fragments: None

Depth to restrictive feature: None

Drainage class: Well drained

Slowest permeability: Very slow (about 0.00 in/hr)

Available water capacity: Low (about 3.3 inches)

Shrink-swell potential: Moderate (about 4.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: About 36 to 54 inches

Runoff class: Low

Land capability classification (non-irrigated): 2e

Typical Profile

Surface layer:

0 to 4 inches—brown very fine sandy loam; very strongly acid

Subsurface layer:

4 to 15 inches—light yellowish brown fine sandy loam; very strongly acid

15 to 30 inches—very pale brown fine sandy loam; very strongly acid

Subsoil:

30 to 39 inches—yellowish brown clay loam; strongly acid

39 to 45 inches—yellowish brown clay loam; strongly acid

45 to 54 inches—brownish yellow clay loam; strongly acid

54 to 80 inches—light brownish gray and red clay; strongly acid

Contrasting Inclusions

- Metcalf soils, which are somewhat poorly drained and are in intermound positions
- Guyton soils, which are gray throughout and occur on flats and in closed depressions

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 1, which is described in the section “Use and Management of the Soils.”
- This soil is well suited to pasture.

Woodland

- See Woodland Management Group 7, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- Because of the low soil strength, harvesting equipment may be difficult to operate and damage may result. The low soil strength may create unsafe conditions for log trucks.
- Uncontrolled burning may destroy organic matter.

Building sites

- The moderate shrinking and swelling of the soil may crack foundations and basement walls. Foundations and other structures may require some special design and construction techniques or maintenance.
- Because of the seasonal high water table, the period when excavations can be made may be restricted and a higher degree of construction site development and building maintenance may be required. Special design of structures is needed to prevent the damage caused by wetness.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The restricted permeability limits the absorption and proper treatment of the effluent from septic systems.
- The seasonal high water table greatly limits the absorption and proper treatment of the effluent from septic systems. Costly measures may be needed to lower the water table in the area of the absorption field.

Local roads and streets

- This soil is well suited to local roads and streets.

TnB—Tenaha loamy fine sand, 1 to 5 percent slopes

Map Unit Composition

Major components:

Tenaha and similar soils—60 to 100 percent

Contrasting inclusions:

Bowie soils—0 to 20 percent

Betis soils—0 to 20 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Ridge on coastal plain

Hillslope position: None

Parent material: Stratified sandstone and shale

Slope range: 1 to 5 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to densic material

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.0 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Medium

Land capability classification (non-irrigated): 3e

Typical Profile

Surface layer:

0 to 3 inches—brown loamy fine sand; strongly acid

Subsurface layer:

3 to 31 inches—light yellowish brown loamy fine sand; strongly acid

Subsoil:

31 to 46 inches—yellowish brown and red sandy clay loam; very strongly acid

46 to 52 inches—red and yellowish brown fine sandy loam; very strongly acid

Substratum:

52 to 80 inches—red weathered bedrock; very strongly acid

Contrasting Inclusions

- Bowie soils, which are loamy throughout
- Betis soils, which are sandy throughout

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Pastureland

- See Pasture Management Group 6, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 12, which is described in the section “Use and Management of the Soils.”
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- This soil is well suited to building site development.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.

Local roads and streets

- This soil is well suited to local roads and streets.

TnD—Tenaha loamy fine sand, 5 to 15 percent slopes

Map Unit Composition

Major components:

Tenaha and similar soils—60 to 100 percent

Contrasting inclusions:

Cuthbert soils—0 to 40 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Convex

Parent material: Sandy stratified sandstone and shale

Slope range: 5 to 15 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to bedrock (densic)

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.3 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 6e

Typical Profile

Surface layer:

0 to 2 inches—dark grayish brown loamy fine sand; strongly acid

Subsurface layer:

2 to 6 inches—light yellowish brown loamy fine sand; moderately acid

6 to 29 inches—light yellowish brown loamy fine sand; very strongly acid

Subsoil:

29 to 35 inches—yellowish brown sandy clay loam; very strongly acid

35 to 41 inches—yellowish brown sandy clay loam; very strongly acid

41 to 55 inches—yellowish brown fine sandy loam; very strongly acid

Substratum:

55 to 75 inches—yellowish brown, red, and pale brown fine sandy loam; very strongly acid

75 to 80 inches—light gray and reddish brown weathered bedrock; very strongly acid

Contrasting Inclusions

- Cuthbert soils, which have a loamy surface layer and may also have a gravelly or stony surface

Use and Management

Major land uses: Most areas are used for pine production

Pastureland

- See Pasture Management Group 8, which is described in the section “Use and Management of the Soils.”
- Erosion control is needed when pastures are renovated.
- Plants may suffer moisture stress during the drier summer months because of the limited available water capacity.
- Using a system of seedbed preparation that minimizes soil disturbance when pastures are renovated conserves soil moisture.
- This soil provides poor summer pasture.

Woodland

- See Woodland Management Group 12, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks.
- The slope may restrict the use of some mechanical planting equipment.
- Uncontrolled burning may destroy organic matter.

Building sites

- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs may be required to ensure satisfactory performance.
- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- Because of the slope, designing local roads and streets is difficult.

TnG—Tenaha loamy fine sand, 15 to 35 percent slopes

Map Unit Composition

Major components:

Tenaha and similar soils—60 to 100 percent

Contrasting inclusions:

Cuthbert soils—0 to 40 percent

Component Description

Major Land Resource Area: Western Coastal Plain (133B)

Landform: Drainageway on coastal plain

Hillslope position: Linear

Parent material: Sandy stratified sandstone and shale

Slope range: 15 to 35 percent

Surface fragments: None

Depth to restrictive feature: 40 to 60 inches to bedrock (densic)

Drainage class: Well drained

Slowest permeability: Moderately slow (about 0.20 in/hr)

Available water capacity: Very low (about 2.1 inches)

Shrink-swell potential: Low (about 1.5 LEP)

Flooding hazard: None

Ponding hazard: None

Depth to seasonal water saturation: More than 6 feet

Runoff class: Low

Land capability classification (non-irrigated): 7e

Typical Profile

Surface layer:

0 to 3 inches—brown loamy fine sand; strongly acid

Subsurface layer:

3 to 21 inches—pale brown loamy fine sand; strongly acid

Subsoil:

21 to 29 inches—strong brown sandy clay loam; very strongly acid

29 to 35 inches—reddish yellow and strong brown sandy clay loam; very strongly acid

35 to 43 inches—strong brown sandy clay loam; very strongly acid

Substratum:

43 to 49 inches—light yellowish brown fine sandy loam; very strongly acid

49 to 80 inches—light yellowish brown, pale brown, and brownish yellow fine sandy loam; very strongly acid

Contrasting Inclusions

- Cuthbert soils, which have a loamy surface layer and may also have a gravelly or stony surface

Use and Management

Major land uses: Most areas are used for pine production; some smaller areas are used for pasture or residential uses

Woodland

- See Woodland Management Group 20, which is described in the section “Use and Management of the Soils.”
- If the soil is disturbed, the slope increases the hazard of erosion.
- The slope increases excavation costs, poses safety hazards, and creates a potential for erosion during the construction of haul roads and log landings.
- The low soil strength may cause the formation of ruts, which can result in unsafe conditions for equipment use and damage to equipment.
- The cost of constructing haul roads and log landings is increased because of the low soil strength.
- The slope creates unsafe conditions for operating equipment and reduces the operating efficiency of log trucks and harvesting and mechanical planting equipment.
- The sandiness of the soil may reduce the traction of wheeled harvest equipment and log trucks.
- Sandy layers may slough, thus reducing the efficiency of mechanical planting equipment.
- Because of the slope, the use of mechanical planting equipment is not practical.
- The slope restricts the use of equipment for preparing sites for planting and seeding.
- Uncontrolled burning may destroy organic matter.

Building sites

- The slope influences the use of machinery and the amount of excavation required. Special building practices and designs are required to ensure satisfactory performance.

- Because of the high content of sand or gravel, the resistance to sloughing is reduced in shallow excavations and cutbanks are susceptible to caving.
- In some areas, the high content of clay in the subsurface layer increases the difficulty of digging, filling, and compacting the soil material in shallow excavations.

Septic tank absorption fields

- The excessive permeability limits the proper treatment of the effluent from septic systems. The poorly treated effluent may pollute the water table in the area of the absorption field.
- Because of the slope, special design and installation techniques are needed for the effluent distribution lines.

Local roads and streets

- Special design of roads and streets is needed to prevent the structural damage caused by the low soil strength.
- Because of the slope, designing local roads and streets is difficult.

W—Water

This map unit includes streams, lakes, and ponds. These areas are covered with water in most years, at least during the period that is warm enough for plants to grow. Many areas are covered with water year-round.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations

appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The pasture management groups are discussed, the estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Pasture Management and Productivity

Robert M. Stellbauer, Range Conservationist, Natural Resource Conservation Service, helped prepare this section.

Shelby County has about 148,303 acres of pastureland. Of this, about 7,500 acres is native pasture and the rest is pastureland planted to improved varieties of introduced grasses. Areas of native pasture have plants that occur naturally and produce forage without the aid of lime or fertilizer. Woody plants invade native pasture and must be controlled to prevent reversion to woodland. Commonly occurring grasses in these native pastures vary according to the type of soil. On the bottomland soils, common grasses include carpetgrass, Dallisgrass, vaseygrass, bushy bluestem, Virginia wildrye, switchcane, and various panicums. The loamy uplands may have various bluestems, such as broomsedge and pinehill, in addition to indiagrass and switchgrass. Sandy uplands may have the same combination of bluestems plus sand and tall dropseed, indiagrass, threeawn, and sandbur.

Several different improved varieties of introduced grasses are adapted to the soils of Shelby County. These include coastal bermudagrass, Tifton 85 bermudagrass, Pensacola bahiagrass, Argentine bahiagrass, weeping lovegrass, and Dallisgrass. These improved varieties of pasture grasses may greatly increase forage yields on most soils if needed fertilizer and lime applications and weed control are utilized. On wetter bottomland soils, bahiagrass, Dallisgrass, switchgrass, eastern gamagrass, Virginia wildrye, or common bermudagrass may produce the highest yields. In some cases, lovegrass may be better suited to very sandy upland soils. Grazing season length may be extended on most pastureland by overseeding legumes, such as white clover, crimson clover, arrowleaf clover, ball clover, and vetch, or by overseeding cool-season annual grasses, such as annual ryegrass, elbon rye, or oats. White clover is best suited to bottomland soils. Crimson clover, arrowleaf clover, ball clover, and vetch are better suited to most upland soils.

Proper pasture management is necessary on all soils. In addition to brush control on native pasture and applications of fertilizer and lime and weed control on improved pasture, prescribed grazing is essential in maintaining forage yields and livestock performance. Prescribed grazing can also reduce the need for weed control, applications of fertilizer, and supplemental feeding. Areas of improved pasture can be severely damaged if overgrazed.

Pasture Management Groups

The soils in Shelby County have been grouped according to their suitability for pasture management. There are twelve groups of soils suited to pasture management and one group not suited to pasture management. Each group is made up of soils that



Figure 5.—A coastal hay meadow on Latex soils.

have similar properties and that respond to similar management practices. Landscape position and the chemical and physical properties of the soils were considered in assigning soils to each group. The following paragraphs discuss the yields, management problems, and plant adaptability that can be expected in areas of improved pasture for each group. For example, Dreka soils are poorly suited to the production of grasses and legumes under normal conditions. This means that in a natural state, without drainage and protection from flooding, land users will have difficulty establishing grasses on these soils. However, Dreka soils may be suitable in areas of native pasture.

The term animal unit month (AUM) is used to describe the forage production that might be expected on a soil. An animal unit month is the amount of forage (800 pounds) required by one mature cow weighing approximately 1,000 pounds, with or without a calf, for 1 month. An AUM is assumed to be 65 percent of the total production under normal growing conditions and with the recommended applications of lime and fertilizer and weed control.

For example, eight animal unit months of forage production (6,400 pounds) feed a 1,000 pound animal for 8 months. In a normal year, perhaps for 5 of these months the forest is grazed and for 3 of these months hay is harvested from the same acre. Proper management is necessary if high yields are expected.

Pasture Management Group 1. This group includes Alazan, Attoyac, Bernaldo, Besner, Cart, Gallime, Latex, Metcalf, Sawtown, and Timpson soils (fig. 5). Soils in map units AbA, AtB, BaB, BeA, BnA, GaB, LtB, MeA, McA, SfA, and MfA are in this group. These nearly level and very gently sloping soils are on stream terraces and marine terraces. They have a loamy surface layer and a loamy subsoil and are moderately well drained or well drained.

These soils have no major limitations affecting pasture and are very well suited to the production of grasses and legumes. Acidity and inadequate fertility are minor limitations that can be corrected with additions of lime and fertilizer.

Adapted grasses on these soils include improved bermudagrass and bahiagrass varieties which can be overseeded with such legumes as crimson clover, white clover, arrowleaf clover, or vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce eight to nine animal unit months (6,400 to 7,200 pounds) of grazing and hay in a normal year.

Pasture Management Group 2. This group includes Iulus, Laneville, and Owentown soils. Soils in map units Iu, La, Lf, Ow, and Ox are in this group. These nearly level soils are on broad flood plains of smaller streams. They have loamy surface layers and a loamy subsoil, are well drained or moderately well drained, and may flood annually.

These soils are very well suited to the production of grasses and legumes. Flooding and slight wetness in some years may interfere with the establishment, maintenance, and harvesting of the forage.

Adapted grasses on these soils include improved bermudagrass, fescue, and bahiagrass varieties which can be overseeded with such legumes as crimson clover, white clover, or vetch. With proper management, including liming, fertilizing, and prescribed grazing, bermudagrass, fescue, or bahiagrass produce eight to nine animal unit months (6,400 to 7,200 pounds) of grazing and hay in a normal year.

Pasture Management Group 3. This group includes Austonio soils in map unit AuD. These moderately sloping to moderately steep soils are on stream terraces. They have a loamy surface layer and a loamy subsoil and are well drained.

These soils are very well suited to the production of grasses and legumes. As slope increases, water runoff increases and less water is able to enter the root zone and be stored for plant production. An increase in slope also increases the hazard of excessive erosion during pasture establishment or renovation or where the pasture is overgrazed.

Adapted grasses on these soils include improved bermudagrass and bahiagrass varieties which can be overseeded with such legumes as crimson clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce eight animal units (6,400 pounds) of grazing and hay in a normal year.

Pasture Management Group 4. This group includes Bowie soils in map unit BwB. These very gently sloping soils are on interstream divides on uplands. They have a loamy surface layer and a loamy subsoil and are well drained.

These soils have no major limitations affecting pasture and are well suited to the production of grasses and legumes. A moderate capacity to store water, however, slightly lowers the potential forage production. Soil acidity and inadequate fertility are minor limitations that can be corrected with additions of lime and fertilizer.

Adapted grasses on these soils include improved bermudagrass and bahiagrass varieties which can be overseeded with such legumes as crimson clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce about seven animal unit months (5,600 pounds) of grazing and hay in a normal year.

Pasture Management Group 5. This group includes Grapeland, Hainesville, and Rentzel soils. Soils in map units GrB, HaB, and RnB are in this group. These nearly level and very gently sloping soils are on the concave lower slopes of uplands and stream terraces. They have sandy surface layers and a loamy or sandy subsoil and are somewhat excessively drained to somewhat poorly drained.

These soils have no major limitations affecting pasture and are moderately well suited to the production of grasses and legumes. Production is limited because the thick, sandy surface layer allows the rapid movement of water and nutrients into and through the plant root zone. The result is low inherent soil fertility and limited amounts of water available for plant production. Soil acidity and inadequate fertility are minor limitations that can be corrected with additions of lime and fertilizer. Slightly wet

conditions during winter and early spring may interfere with the harvesting of hay, grazing management, or equipment use.

Adapted grasses on these soils include weeping lovegrass and improved bermudagrass varieties which can be overseeded with legumes such as vetch. With proper management, including liming, split applications of fertilizer, and prescribed grazing, improved bermudagrass varieties produce seven animal unit months (5,600 pounds) of grazing and hay in a normal year.

Pasture Management Group 6. This group includes Betis, Darco, Lilbert, and Tenaha soils. Soils in map units BfC, DaC, LuC, and TnB are in this group. These gently sloping to moderately sloping soils are on broad interstream divides on uplands. They have a thick sandy surface layer and a loamy subsoil and are excessively drained to well drained.

These soils are moderately well suited to the production of grasses and legumes. Production is limited because the sandy surface layer allows the rapid movement of water and nutrients through the plant root zone. The result is low inherent soil fertility and limited amounts of water available for plant production.

Adapted grasses on these soils include weeping lovegrass and improved bermudagrass varieties which can be overseeded with legumes such as vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce five to six animal unit months (4,000 to 4,800 pounds) of grazing and hay in a normal year.

Pasture Management Group 7. This group includes Cuthbert, Kirvin, Meth, Maben, Sacul, and Eastwood soils. Soils in map units CbE, EeB, EIA, KgC, KfC, MhC, and SaC and are in this group. These gently sloping soils are on broad interstream divides on uplands. They have a loamy surface layer and a clayey subsoil and are well drained or moderately well drained.

These soils are moderately well suited to the production of grasses and legumes. Production is decreased slightly because the clayey subsoil limits water intake and water storage. Soil acidity and inadequate fertility are minor limitations that can be corrected with additions of lime and fertilizer.

Adapted grasses on these soils include improved bermudagrass and bahiagrass varieties which can be overseeded with such legumes as crimson clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass produces four to five animal unit months (3,200 to 4,000 pounds) of grazing and hay in a normal year.

Pasture Management Group 8. This group includes Darco and Tenaha soils. Soils in map units DaE and TnD are in this group. These strongly sloping to moderately steep soils are on broad interstream divides on uplands. They have a thick sandy surface layer over a loamy subsoil and are excessively drained to well drained.

These soils are moderately well suited to the production of grasses and legumes. Production is limited because a sandy surface layer allows the rapid movement of water and nutrients through the plant root zone. The result is low inherent fertility and limited amounts of water available for plant production. In addition, as slope increases to more than 10 percent, equipment use is impaired due to loose, sandy surfaces.

Adapted grasses on these soils include weeping lovegrass and improved bermudagrass varieties which can be overseeded with legumes such as vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce four to five animal unit months (3,200 to 4,000 pounds) of grazing in a normal year.

Pasture Management Group 9. This group includes Cuthbert, Eastwood, and Maben soils. Soils in map units CbE, CgE, EeD, and MaE are in this group. These strongly sloping to moderately steep soils are on broad interstream divides on uplands. They have a loamy surface layer and a clayey subsoil and are moderately well drained.

These soils are moderately well suited to the production of grasses and legumes.

Production is limited because a clayey subsoil limits water intake and water storage. In addition, as slope increases to more than 10 percent, water runoff increases and less water is able to enter the root zone and be stored for plant production. An increase in slope also increases the hazard of excessive erosion during pasture establishment or renovation or where the pasture is overgrazed.

Adapted grasses on these soils include improved bermudagrass and bahiagrass varieties which can be overseeded with such legumes as crimson clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce about three to four animal unit months (2,400 to 3,200 pounds) of grazing in a normal year.

Pasture Management Group 10. This group includes Bonn, Guyton, and Mollville soils. Soils in map unit BnA, GaA, GtA, and MpA are in this group. These nearly level soils are in depressions on broad mounded stream terraces. They have a loamy surface layer and a loamy subsoil, are poorly drained, and may have water ponded on the surface during late winter and early spring.

These soils are poorly suited to the production of grasses and legumes. Production is limited because of severe subsoil wetness, ponding on the surface, and poor internal soil drainage. The extreme wetness also interferes with the establishment, maintenance, and harvest of forage.

Adapted grasses on these soils include fescue, common bermudagrass, switchgrass, and bahiagrass which can be overseeded with such legumes as white clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, about two animal unit months (1,600 pounds) of grazing are produced in a normal year.

Pasture Management Group 11. This group includes Dreka soils in map unit Dr. These nearly level soils are on broad flood plains of large streams. They have loamy to clayey surface layers and a loamy to clayey subsoil, are somewhat poorly drained, and may be flooded annually.

These soils are poorly suited to the production of grasses and legumes. Production is limited because of severe wetness, water ponding on the surface, flooding, and poor internal soil drainage. The extreme wetness also interferes with the establishment, maintenance, and harvest of forage.

Adapted grasses include fescue, common bermudagrass, switchgrass, and bahiagrass which can be overseeded with such legumes as white clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, about one to two animal unit months (800 to 1,600 pounds) of grazing are produced in a normal year.

Pasture Management Group 12. This group includes graded Kirvin soils and graded Cuthbert soils. Soils in map units CrG and KsC are in this group. These gently sloping and sloping soils are on broad interstream divides on uplands. The gravelly surface layer and the upper part of the subsoil have been removed. The resulting surface is loamy to clayey with small piles of gravelly material. These soils are well drained.

These soils are very poorly suited to the production of grasses and legumes. Production is decreased because the exposed clayey subsoil limits water intake and water storage. For a few years after the surface has been removed, it is difficult to establish pasture grasses because of the droughty surface layer. Acidity and inadequate fertility are minor limitations that can be corrected with additions of lime and fertilizer. The surface may have rills or small gullies, which hinder harvesting.

Adapted grasses include improved bermudagrass and bahiagrass varieties which can be overseeded with such legumes as crimson clover or vetch. With proper management, including liming, fertilizing, and prescribed grazing, improved bermudagrass varieties produce about one animal unit month (800 pounds) of grazing

in a normal year. In some areas, it may be necessary to plant lovegrass until soil tilth is replaced.

Group not suited to pasture. This group includes soils that in their natural state are not suited to pasture management but may be used as native pasture. Cuthbert, Maben, and Tenaha soils in map units CsG, CtG, MaG, and TnG are so steep that farm machinery cannot be safely operated.

Yields per Acre

The average yields per acre that can be expected of the principal pasture plants under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various pasture plants depends on the kind of soil and the pasture plant. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding pasture plant varieties; appropriate and timely pasture renovation; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each pasture plant; effective use of barnyard manure; and careful grazing management.

The estimated yields reflect the productive capacity of each soil for each of the principal pasture plants. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Pasture plants other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such pasture plants is small. The local office of the Natural Resources Conservation Service or of the Texas Cooperative Extension can provide information about the management and productivity of the soils for those pasture plants.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (13). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forestland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, forestland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Prime Farmland

In this section, prime farmland is defined, and the soils in Shelby County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Hydric Soils

In this section, hydric soils are defined and described. The hydric status of soils in the survey area is shown in table 7.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (3, 7, 8, 9). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (4). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

Nearly all hydric soils exhibit characteristic morphologies that result from repeated periods of saturation and/or inundation for more than a few days. Saturation or inundation when combined with microbial activity in the soil cause a depletion of oxygen. This anaerobiosis promotes biogeochemical processes such as the accumulation of organic matter and the reduction, translocation, and/or accumulation of iron and other reducible elements. These processes result in characteristic morphologies which persist in the soil during both wet and dry periods, making them particularly useful for identifying hydric soils.

Morphological features of hydric soils indicate that saturation and anaerobic conditions have existed under either contemporary or former (recent) hydrologic regimes. Features that do not reflect contemporary or recent hydrologic conditions of saturation and anaerobiosis are relict features. Typically, contemporary and recent hydric soil morphologies have diffuse boundaries; relict hydric soil features have sharp boundaries. When soil morphology seems inconsistent with the landscape, vegetation, or observable hydrology, it may be necessary to obtain the assistance of an experienced soil or wetland scientist to determine whether the soil is hydric.

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (6).

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (5). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (12) and "Keys to Soil Taxonomy" (11) and in the "Soil Survey Manual" (14).

Hydric soils are identified by examining and describing the soil to a depth of about

20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

The following criteria reflect those soils that are likely to meet the definitions of hydric soils in Shelby County:

1. Soils in Aquic suborders, great groups, or subgroups that are:
 - a. Somewhat poorly drained and have a water table at the surface during the growing season, or
 - b. Poorly drained or very poorly drained and have
 - (1) A water table at the surface during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
 - (2) A water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hour in all layers within a depth of 20 inches, or
 - (3) A water table at a depth 1.0 foot or less during the growing season if permeability is less than 6.0 in/hour in any layer within a depth of 20 inches, or
2. Soils that are frequently ponded for long duration or very long duration during the growing season, or
3. Soils that are frequently flooded for long duration or very long duration during the growing season.

Table 7 lists the map units in Shelby County that are considered hydric and indicates the hydric soil designations and criteria met for each major component in those map units. The list includes major components that are phases of soil series that may or may not have been drained or protected from flooding. Some soil series, designated as hydric, have phases that are not hydric depending on flooding and ponding characteristics. This list has a number of agricultural and nonagricultural applications, including assistance in land use planning, conservation planning, and assessment of potential wildlife habitat. An area that meets the hydric soil criteria must also meet the hydrophytic vegetation and wetland hydrology criteria in order for it to be classified as a jurisdictional wetland.

The map units in table 7 that meet the definition of hydric soils and have at least one of the hydric soil indicators. This table can help in planning land uses. However, map units that are made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform. Onsite investigation is needed to determine the hydric soils on a specific site (6, 7).

Forest Management and Productivity

Ray Stoner, Forester, Natural Resources Conservation Service, helped prepare this section.

Shelby County has about 357,700 acres of woodland. About 31 percent of the woodland is classified as pine, 21 percent is classified as pine/hardwood, and 48 percent is classified as hardwood. In addition to producing commercial wood products, woodland provides recreational opportunities and important wildlife habitat. The largest owner group is by far the non-industrial, private landowners who own 208,638 acres. Large industrial landowners own about 61,300 acres, and the U.S. Forest Service



Figure 6.—Timber stand improvement in Shelby County.

owns 67,762 acres. State and local governments own the remaining acreage of woodland.

Timber products are a major source of income for the county. Lumber, pulpwood, crossties, pallet material, stakes, and crates are manufactured from the timber.

Plant habitats in Shelby County range from droughty, sandy sites to frequently flooded bottomlands. The plant communities therefore range from shortleaf pine/sandjack oak types to willow oak/green ash/sweetgum types. The major forest management problem in the county is the harvesting of timber without adequate reforestation follow-up.

The tables in this section can help forest owners or managers plan the use of soils for wood crops (figs. 6 and 7). They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forest management.

Woodland Management Groups

The soils in Shelby County that are suitable for wood crops have been placed in twenty groups according to their suitability for woodland management. Each group is made up of soils that have similar properties and that respond to similar management practices. The landscape position and the chemical and physical properties of the soils were considered in assigning soils to each group. The soils in group 21 are not suited to pine production.

Woodland Management Group 1. This group includes the Owentown soils in map



Figure 7.—Woodland management in a Metcalf-Timpson complex.

units Ow and Ox. These loamy soils are on small flood plains and may be flooded for brief periods. They are suited to the production of both pine and hardwood trees.

Common trees in the overstory are loblolly pine, green ash, sweetgum, white oak, water oak, and cherrybark oak. The site index for loblolly pine, sweetgum, and bottomland oaks averages 100 feet. The yield from an unmanaged natural stand of loblolly pine over a 50-year period is approximately 430 board feet per acre per year. The yield for sweetgum is approximately 310 board feet per acre per year. Management can substantially increase these yields, and it should include attention to streamside management zone practices so that water quality is protected.

Although harvesting or management operations may be temporarily interrupted due to brief periods of flooding, there is no difficulty in long-range operations. Since areas of these soils may often be included in streamside management zones, road and trail construction should be limited.

Woodland Management Group 2. This group includes the lulus and Laneville soils in map units lu, La, and Lf. These loamy soils are on small flood plains. They have a high water table during winter and spring and may be flooded for brief periods during this time. They are suited to the production of pine and hardwood trees.

Common trees in the overstory are loblolly pine, water oak, cherrybark oak, white ash, and sweetgum. The site index for loblolly pine and sweetgum averages 100 feet but can range from 95 to more than 110 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 430 board feet per acre per year. The yield for sweetgum is approximately 310 board feet per acre per year. Management can substantially increase these yields, and it should include attention to streamside management zone practices so that water quality is protected.

Flooding and a high water table may restrict access for periods during winter and spring. Modified equipment, such as tandem-axled and four-wheel drive vehicles, may

be needed for much of the year. Control of invading brush and undesirable species may be needed in regeneration operations. Since areas of these soils may often be included in streamside management zones, road and trail construction should be limited.

Woodland Management Group 3. This group includes the Attoyac and Bernaldo soils in map units AtB and BaB. These loamy soils are on stream terraces and are suited to the production of pine and hardwood trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, southern red oak, water oak, and white oak. The site index for loblolly pine averages 95 feet but can range from 90 to more than 100 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 380 board feet per acre per year. The yield for sweetgum is approximately 260 board feet per acre per year. Management can substantially increase these yields.

There are no significant management problems associated with these soils.

Woodland Management Group 4. This group includes the Hainesville soils in map unit HaB. These sandy soils are on stream terraces and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, southern red oak, and white ash. The site index for loblolly pine averages 95 feet but can range from 90 to 105 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 380 board feet per acre per year. Management can substantially increase this yield.

The coarse texture of these soils may cause severe problems with equipment use, especially during dry periods. Modified equipment, such as tandem-axled, four-wheel drive, and wide-tired vehicles, may be needed during dry periods. The successful establishment of planted pine requires attention to proper planting depth and soil compaction. Planting when the soil is moist is helpful. Control of herbaceous weeds, either during site preparation or as a release during the first growing season, may also be needed.

Woodland Management Group 5. This group includes the Alazan and Rentzel soils in map units AbA and RnB. Alazan soils are on broad, mounded terraces. Rentzel soils are on toeslopes. Soils in this group have a high water table during winter. They are suited to the production of pine and hardwood trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, water oak, willow oak, southern red oak, and white oak. The site index for loblolly pine and sweetgum averages 93 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 350 board feet per acre per year. The yield for sweetgum is approximately 260 board feet per acre per year. Management can substantially increase these yields.

Some restriction of equipment use can be expected during winter due to a high water table. Care must be taken to prevent excessive rutting, especially on the flatter slopes. The abundant available moisture can lead to a plant competition problem for new pine seedlings. Site preparation or release that can control invading brush may be necessary. During road design and layout, extremely flat or depressional areas should be avoided and normal drainage should not be interrupted. Maintenance is necessary to fill ruts and holes. Since areas of these soils may often be included in streamside management zones, road and trail construction should be limited.

Woodland Management Group 6. This group includes the Dreka soils in map unit Dr. These loamy soils are on broad flood plains and may be flooded for brief to long periods during winter and spring. They are best suited to the production of hardwood trees.

Common trees in the overstory are willow oak, cherrybark oak, green ash, American elm, and sweetgum. The site index for sweetgum averages 95 feet. The yield from an unmanaged, natural stand of sweetgum over a 50-year period is

approximately 260 board feet per acre per year. Management can substantially increase this yield, and it should include attention to streamside management zone practices so that water quality is protected.

Wetness greatly restricts access for much of the year. Specialized equipment and harvesting techniques are needed. Control of undesirable, shade-tolerant species is necessary in regeneration efforts. Since areas of these soils may often be included in streamside management zones, road and trail construction should be limited.

Woodland Management Group 7. This group includes the Austonio, Besner, Bowie, Cart, Gallime, Latex, Sawtown, and Timpson soils in map units AuD, AbA, BeA, BnA, BwB, EIA, GaA, GaB, LtB, MeA, MpA, and SfA. These loamy soils are on terraces and low uplands and also occur in a mounded complex with other soils, such as the Mollville-Besner complex. They are suited to the production of pine and hardwood trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, southern red oak, water oak, and white oak. The site index for loblolly pine and sweetgum averages 90 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 330 board feet per acre per year. The yield for sweetgum is approximately 210 board feet per acre per year. Management can substantially increase these yields.

There are no significant management problems associated with these soils. During road design and layout, extremely flat or depressional areas and areas of the steeper Austonio soils should be avoided.

Woodland Management Group 8. This group includes the Lilbert soils in map unit LuC. These sandy soils are on uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, post oak, white ash, sweetgum, and hickory. The site index for loblolly pine averages 90 feet but can range from 80 to 95 feet, depending on slope grade and slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 330 board feet per acre per year. Management can substantially increase this yield.

The coarse texture of these soils may cause equipment limitations, particularly during dry periods. Modified equipment, such as tandem-axled, four-wheel drive, or wide-tired vehicles may be needed. In addition, little available moisture may cause seedling mortality to be significant in dry years. A successful establishment of planted pine requires attention to proper planting depth and soil compaction. Planting when the soil is moist is helpful. Control of herbaceous weeds, either during site preparation or as a release during the first growing season, may also be needed.

Woodland Management Group 9. This group includes the Metcalf and Sacul soils in map units McA, MeA, MfA, and SaC. These soils are either on broad terraces or on low upland sites and may be wet during winter due to a high water table. They are suited to the production of pine and hardwood trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, water oak, willow oak, southern red oak, and white oak. The site index for loblolly pine and sweetgum averages 90 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 330 board feet per acre per year. The yield for sweetgum is approximately 210 board feet per acre per year.

Restriction of equipment use can be expected during winter due to a high water table. Care must be taken to prevent excessive rutting, especially on the flatter slopes. The abundant available moisture can lead to a plant competition problem for new pine seedlings. Site preparation or release that controls invading brush may be necessary. During road design and layout, extremely flat or depressional areas should be avoided and normal drainage should not be interrupted. Maintenance is necessary to fill ruts and holes.

Woodland Management Group 10. This group includes the Kirvin and Meth soils

in map units KfC and MhC. These loamy soils are on gently sloping uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, southern red oak, sweetgum, and hickory. The site index for loblolly pine averages 85 feet but can range from 80 to 90 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 280 board feet per acre per year. Management can substantially increase this yield.

There are no significant management problems associated with these soils. On the steeper slopes, proper road design and layout that includes the use of water-control devices, such as water bars and wing ditches, is needed.

Woodland Management Group 11. This group includes Cuthbert and Maben soils in map units CtG and MaG. These loamy soils are on rolling uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, white ash, sweetgum, post oak, southern red oak, and white oak. The site index for loblolly pine averages 85 feet but can vary significantly depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 280 board feet per acre per year. Management can substantially increase this yield.

As slopes increase, the potential for erosion increases. Therefore, care must be taken to avoid excessive uphill and downhill rutting during skidding and hauling. Intensive site preparation should be limited to the gentler slopes, and machine tree planting should be done on the contour. Because clay is within 10 inches of the surface, particular attention must be given to tree planting methods that ensure proper root placement and soil compaction. In some cases, subsoiling before planting may be needed. The clayey subsoil may restrict equipment use during wet weather. During road design, consideration should be given to avoid the steeper slopes. If roads must be built on these slopes, long, uninterrupted grades should be avoided and adequate water-control devices, such as water bars and dips, should be installed. Care must be taken to empty wing ditches as often as possible and to always empty them onto stable outlets. On the steeper sites, sloughing may be a problem. Cuts and fills should be kept to a minimum and shaped to as flat a slope as possible. When necessary, seeding problem areas, such as ditches and outlets, should be considered.

Woodland Management Group 12. This group includes the Tenaha soils in map units TnB and TnD. These sandy soils are on uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, post oak, southern red oak, and white oak. The site index for loblolly pine averages 85 feet but can vary depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 280 board feet per acre per year. Management can substantially increase this yield.

Generally, these soils are not very erosive. Uphill and downhill rutting, however, should be avoided, particularly on the steeper slopes. The coarse texture of these soils may restrict equipment use, particularly during dry periods. Modified equipment, such as tandem-axled, wide-tired, or four-wheel drive vehicles, may be needed, especially during the dry periods. The moderate available water capacity may result in significant seedling mortality rates during dry years. The successful establishment of planted pine requires attention to proper planting depth and soil compaction. Planting when the soil is moist is helpful. Control of herbaceous weeds, either during site preparation or as a release during the first growing season, may also be necessary. As slopes increase, the need for proper road design, including the installation of water-control devices, such as water bars, becomes more important. Wing ditches should be emptied as often as possible and emptied only onto stable outlets. If roads must be built on the steeper slopes, long uninterrupted grades should be avoided. Revegetating disturbed areas may be needed on the steeper slopes.

Woodland Management Group 13. This group includes the Betis, Darco, and Grapeland soils in map units BfC, DaC, DaE, and GrB. These sandy soils are on uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, post oak, and hickory. The site index for loblolly pine averages 85 feet but can range from 80 to 90 feet, depending on slope grade and slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 280 board feet per acre per year. Management can substantially increase this yield.

Generally, these soils are not very erosive. In order to minimize the erosion associated with logging, care must be taken to prevent uphill and downhill rutting during skidding and hauling on the steeper slopes. Machine planting should be done on the contour on the steeper slopes. The coarse texture of these soils may restrict equipment use during dry periods. Modified equipment, such as tandem-axled, four-wheel drive, and wide-tired vehicles, may be needed. The seedling mortality rate may be significant due to the low available water capacity. The successful establishment of planted pine requires attention to proper planting depth and soil compaction. Planting when the soil is moist is helpful. Control of herbaceous weeds, either during site preparation or as a release during the first growing season, may also be needed. Some replanting may be necessary, especially following a particularly dry year. As slopes increase, the need for proper road design and construction becomes more important. Long, uninterrupted grades should be avoided, and water-control devices should be installed. Wing ditches should be emptied as often as possible and emptied only onto stable outlets. Revegetating potential problem areas should be considered.

Woodland Management Group 14. This group includes the Eastwood soils in map units EeB, EIA, and EeD. These loamy soils are on rolling uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, hickory, post oak, southern red oak, and white oak. The site index for loblolly pine averages 90 feet but can range from 85 to 95 feet depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 330 board feet per acre per year. Management can substantially increase this yield.

As slopes increase, the potential for erosion increases. Uphill and downhill rutting should be avoided during harvesting. Intensive site preparation should be restricted to the flatter slopes, and machine tree planting should be on the contour. The clayey subsoil may restrict equipment use during wet periods. Modified equipment, such as four-wheel drive vehicles, may be needed. Rutting should be avoided on the flatter slopes, and temporary restrictions may be needed during wet periods. The clayey subsoil may also cause problems in tree planting. Attention to planting methods is important to ensure proper root placement and soil compaction. Subsoiling before machine planting may also improve seedling survival rates. As slopes increase, proper road design and construction, including the installation of water-control devices, such as water bars, dips, and wing ditches, becomes more important. Long, uninterrupted grades should be avoided. On the steeper sites, sloughing may be a problem. Cuts and fills should be kept to a minimum and shaped to as flat a slope as possible. Revegetating potential problem areas should be considered.

Woodland Management Group 15. This group includes the Cuthbert and Kirvin soils in map units CgE and KgC. These gravelly soils are on rolling uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, hickory, sweetgum, post oak, southern red oak, and white oak. The site index for loblolly pine averages 80 feet but can range from 75 to 90 feet depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 230 board feet per acre per year. Management can substantially increase this yield.

As slopes increase, the potential for erosion also increases, particularly if the soil

surface is disturbed. Management practices that cause as little disturbance as possible should be chosen for sites with the steeper slopes. On such sites, less intensive site preparation and regeneration methods, such as roller chopping, burning, underplanting, or deadening, should be considered. Intensive site preparation should be restricted to the flatter slopes. Also, harvesting methods should be modified on the steeper slopes to prevent excessive erosion. Uphill and downhill rutting should be avoided. The clayey subsoil may restrict equipment use, especially during wet periods. Modified equipment, such as four-wheel drive vehicles, may be needed. Attention to planting methods is important to ensure proper root placement and soil compaction. Subsoiling on the flatter slopes prior to machine planting may be helpful in getting the proper planting depth. Proper road design and construction becomes important as the slopes increase. Water-control devices, such as water bars, dips, and wing ditches, must be installed on the steeper slopes. Care must be taken to empty these devices only onto stable outlets. Long, uninterrupted grades should be avoided. Seeding problem areas, such as ditches and ditch outlets and other disturbed areas, may be needed.

Woodland Management Group 16. This group includes the Cuthbert and Maben soils in map units CbE and MaE. These soils are on steep uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, hickory, post oak, southern red oak, and white oak. The site index for loblolly pine averages 80 feet but can range from 75 to 85 feet depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 230 board feet per acre per year. Management can substantially increase this yield.

The steep slopes of these soils can cause severe equipment limitations and increase the potential for erosion. Harvesting methods need to be adjusted to limit the use of equipment as much as possible. Skidding should either be restricted to selected trails or done on as gentle an uphill grade as possible. Traffic should be excluded or restricted during wet periods. Site preparation and tree planting should cause a minimum of disturbance to the site. Underplanting or hand planting followed by release should be considered. Attention to planting methods is important to ensure proper root placement and soil compaction. Because the slopes on these soils exceed the recommended maximum grade for roads, construction should be avoided whenever possible. If this is not possible, adequate water-control devices, such as water bars, dips, and wing ditches, must be installed. Care must be taken to empty these devices only onto stable outlets. Seeding the road surface may be necessary. Seeding ditches and outlets, and other problem and disturbed areas, should be planned.

Woodland Management Group 17. This group includes the Guyton and Mollville soils in map units GaA, GtA, and MpA. These loamy soils are on nearly level terraces and in some depressional areas. They may be saturated during winter and are suited to the production of pine and hardwood trees.

Common trees in the overstory are loblolly pine, water oak, willow oak, sweetgum, and green ash. The site index for loblolly pine, water oak, and sweetgum averages 80 feet. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 230 board feet per acre per year. The yield for sweetgum is approximately 120 board feet per acre per year. Management can substantially increase these yields.

Wetness during much of the year may greatly restrict the use of equipment. Harvesting should be planned during the drier periods, and modified equipment, such as tandem-axled, wide-tired, or four-wheel drive vehicles, may be needed most of the time. Care should be taken to prevent excessive rutting.

Woodland Management Group 18. This group includes the Kirvin soils in map units KsC and CrG. These soils are on uplands. The surface layer has been removed for gravel. These soils are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, post oak, southern red oak, and hickory. The site index for loblolly pine averages 65 feet but can vary depending on the amount of site disturbance. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 95 board feet per acre per year.

The lack of a surface layer and the clayey texture of these soils cause concern during all phases of management. Stabilizing these soils against erosion is often needed because of sparse vegetation. Seeding may be needed. Because clay may occur at the surface, attention to tree planting methods is important. Subsoiling prior to planting may be required, and attention must be given to root placement and soil compaction. Harvesting methods that minimize soil disturbance should be planned. The use of equipment may be restricted during wet periods. Roads built on these soils must have adequate water-control devices, such as water bars, dips, and wing ditches. Care must be taken to empty these devices only onto stable outlets. Seeding outlets and ditches may be necessary.

Woodland Management Group 19. This group includes the Cuthbert soils in map unit CsG. These soils are on steep uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, hickory, post oak, southern red oak, and white oak. The site index for loblolly pine averages 75 feet but can vary depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 180 board feet per acre per year. Management can substantially increase this yield.

The stony surface and steep slopes of these soils may severely limit equipment use and increase the potential for erosion. Harvesting methods need to be adjusted to limit the use of equipment as much as possible. Skidding should be restricted to selected trails or done on as gentle an uphill grade as possible. Cabling should be considered. Traffic should be excluded or restricted during wet periods. Site preparation and tree planting operations should cause a minimal disturbance to the site. Underplanting or hand planting followed by release should be considered. Attention to planting methods is important to ensure proper root placement and soil compaction. Planting can also be hindered by the presence of rocks on the surface. Hand planting may be the only way to ensure proper seedling placement. Because slopes on these soils exceed the maximum grade for roads and the rocks can make road construction excessively expensive, construction should be avoided whenever possible. If this is not possible, adequate water control devices, including water bars and wing ditches, must be installed. Care must be taken to empty these devices only onto stable outlets. Seeding the road surface may be necessary. Seeding ditches and outlets and other problem and disturbed areas should be planned.

Woodland Management Group 20. This group includes the Tenaha soils in map unit TnG. These sandy soils are on uplands and are best suited to the production of pine trees.

Common trees in the overstory are loblolly pine, shortleaf pine, sweetgum, post oak, southern red oak, and white oak. The site index for loblolly pine averages 85 feet but can vary depending on slope position. The yield from an unmanaged, natural stand of loblolly pine over a 50-year period is approximately 280 board feet per acre per year. Management can substantially increase this yield.

Because of the steep slopes of these soils, erosion may be a serious problem, particularly if water is confined in channels such as ruts, ditches, or roads. Uphill and downhill rutting must be avoided during the harvesting season. Skidding should be done on a gentle uphill grade. Site preparation methods should be planned to keep as much organic material as possible on the soil surface. The moderate available water capacity of these soils may result in significant seedling mortality rates during dry years. If seedlings are machine planted, they should be planted on the contour.

Successful establishment of planted pines requires attention to proper planting depth and soil compaction. Planting when the soil is moist is helpful. Control of herbaceous weeds, either during site preparation or as a release during the first growing season, may also be necessary. Because the slope of these soils exceeds the maximum recommended grade for roads, construction should be avoided whenever possible. Temporary roads and trails should be retired after use, and the areas reshaped, if necessary, seeded, and restricted from further access. Problem and disturbed areas should be seeded.

Woodland Management Group 21. The Bonn soils in map unit BnA are in this group. These soils are in depressional areas and on flats on stream terraces. Bonn soils are not suited to the production of pine trees due to toxic levels of salts.

Forest Productivity

In table 8, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual" (10), which is available at the local office of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed in board feet (Doyle Rule) per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest (fig. 8).

Forest Management

In table 9, parts I through IV, interpretive ratings are given for various aspects of forest management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified forest management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations (fig. 9). The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified forest management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for fire damage and seedling mortality are expressed as *low*, *moderate*, and *high*. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).



Figure 8.—Loblolly pine and shortleaf pine on Eastwood soils.

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management practices. More detailed information about the criteria used in the ratings is available in the “National Forestry Manual,” which is available at the local office of the Natural Resources Conservation Service or on the Internet (<http://nssc.nssc.nrcs.usda.gov/nfm/>).

For *limitations affecting construction of haul roads and log landings*, the ratings are based on slope, flooding, permafrost, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer that is indurated, depth to a water table, and ponding. The limitations are described as slight, moderate, or severe. A rating of *slight* indicates that no significant limitations affect construction activities, *moderate* indicates that one or more limitations can cause some difficulty in construction, and *severe* indicates that one or more limitations can make construction very difficult or very costly.

The ratings of *suitability for log landings* are based on slope, rock fragments on the

surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.



Figure 9.—An example of windthrow hazard in an area of graded Kirvin soils.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

Woodland Understory Vegetation

Understory vegetation consists of grasses, forbes, shrubs, and other plants. If well managed, woodland can produce enough understory vegetation to support the grazing of livestock or wildlife, or both, without damage to the trees.

Timber farming is the major enterprise in Shelby County. Livestock farming is an important part, and cow-calf enterprises are dominant. Most farmers do not allow grazing in wooded areas.

The quantity and quality of understory vegetation varies according to the kind of soil, the age and kind of trees, the density of the canopy, and the depth and condition of forest litter. The density of the forest canopy affects the amount of light that understory plants receive during the growing season. Good silvicultural practices, such as thinning timber stands, removing or culling trees, and controlling burning, as well as livestock management, are necessary to maintain moderate or good production of understory vegetation. Unless these practices are used, the extent of the canopy cover increases significantly because of the growth of shrubs and hardwood in the midstory.

Forage production is highest after an area is clear cut. Hbage yields average about 1,500 pounds (air-dry weight) per acre annually. On choice sites the yield can

exceed 3,000 pounds. On grazed woodland that is periodically burned, grasses make up at least 80 percent of the vegetation. Sedges, forbs, and shrubs make up the rest.

Table 10 lists the major plants in the canopy that represents the highest wood production for the forest crop of the particular soil. The understory vegetation includes the herbaceous plants and leaves, twigs, and fruit of woody plants that have a height of as much as 4.5 feet. The annual production is expressed in pounds per acre of air-dry vegetation that is expected in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the growing season; in a normal year, it is average; and in an unfavorable year, it is below average.

Recreation

Shelby County has the wildlife, water areas, and characteristic beauty of the “East Texas Pineywoods.” About 90 percent of the county is used for recreational activities, including hunting, fishing, swimming, boating, camping, bird-watching, picnicking, hiking, and sightseeing. The county also provides opportunities for photography.

The Toledo Bend Reservoir, Lake Pinkston, Lake Timpson, the Sabine River, the Attoyac River, and numerous creeks and small impoundments provide opportunities for recreation. In the spring, flowering dogwood, redbud, hawthorn, clover, and wildflowers add color to the forests and open areas. The Ragtown Recreation Area, which is managed by the U.S. Forest Service, and Haley’s Ferry Recreation Area, which is managed by the Sabine River Authority, provide recreational facilities in the eastern part of the county.

Leases are available from some landowners for deer hunting. The Toledo Bend Reservoir, the Sabine River, and numerous other streams provide opportunities for waterfowl hunting. The North Toledo Bend Wildlife Management Area, which is managed by the Texas Parks and Wildlife Department, provides excellent opportunities for waterfowl hunting. Generally, the hunting clubs in the county are on the timber company lands.

The soils of the survey area are rated in table 11, parts I and II, according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season

when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in table 11 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic

materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Bill Deauman, Biologist, Natural Resources Conservation Service, helped prepare this section.

Fish and wildlife in Shelby County are products of the land that provides their basic habitat requirements—food, water, and cover. Soil, climate, topography, and, to large degree, human influence have an effect on the quality and quantity of available habitat.

The Texas Park and Wildlife Department has identified four major habitats in Shelby County: (1) willow oak/water oak/blackgum forest, (2) young forest/grassland, (3) pine/hardwood forest, and (4) native/introduced grass. In addition to these habitat types, aquatic habitat exists as fresh marshes, upland depressional wetlands, and open water habitat, including Toledo Bend Lake, Lake Timpson, Lake Pinkston, the Attoyac River, and many smaller creeks, such as Flat Fork, Huana Creek, and Tenaha Creek.

The willow oak/water oak/blackgum forest habitat type occurs on the flood plains and associated terraces of the rivers and other drainageways. Soils characteristic of the flood plains are Iulus, Laneville, and Dreka. Associated plants species on the flood plains include overcup oak, red maple, black willow, palmetto, elderberry, Alabama supplejack, greenbrier, and trumpet creeper. Plant species for the some of the wetter marsh-like soil inclusions are giant cutgrass, soft rush, smartweed, and buttonbush. Examples of terrace soils include Austonio, Attoyac, Bernaldo, Besner, Cart, Guyton, Hainesville, Mollville, Sawtown, and Timpson. Plant species associated with the terrace soils include loblolly pine, white oak, beech, hackberry, American elm, water hickory, and water locust with water oaks in the wetter, depressional areas of such soils as Mollville and Guyton.

These flood plain and terrace areas are some of the most productive wildlife lands in the county and provide habitat to migratory and resident waterfowl, white-tailed deer, eastern wild turkey, beaver, raccoon, mink, bobcat, gray squirrel, fox squirrel, woodpeckers, and songbirds. Alligators, water snakes, frogs, toads, turtles, and salamanders also live in these areas.

Improvement practices applicable to this habitat type include selective thinning during hardwood reforestation, where needed, and installation of structures to create shallow water areas for waterfowl.

The young forest/grassland habitat type is not soil or site specific. Areas of this habitat type usually develop 7 to 10 years after clearcutting and replanting. Plant species vary but generally consist of loblolly pine, shortleaf pine, various oaks, sweetgum, and hickory. Shrubs, grasses, and forbs of this habitat type include sumac, sassafras, blackberry, greenbrier, hawthorn, yaupon, tickclover, lespedeza, ragweed, dogfennel, broomsedge bluestem, pinehill bluestem, vaseygrass, and Florida paspalum. This habitat type provides food and cover for deer, turkey, cottontail rabbit, and woodcock. On sandy soils, such as Darco and Betis, the abundance of annual forbs and perennial legumes and the lack of dense herbaceous cover offer the potential for the production of bobwhite quail and mourning doves.

As this habitat type ages, practices that can help maintain or improve its quality are annual disking, creation of food plots, and selective thinning.

The pine/hardwood forest is the largest habitat type in Shelby County. This habitat type generally occurs on upland soils, such as Cutbert, Eastwood, Kirvin, Maben, Meth, and Sacul, and is not specific to topography. Plant species associated with this habitat include loblolly pine, shortleaf, sweetgum, white oak, red oak, hickory, American beautyberry, dogwood, yaupon, greenbrier, longleaf uniola, beaked panicum, lespedeza, and tick clover. White-tailed deer, turkey, fox squirrel, raccoon,

possum, bobcat, owls, hawks, woodpecker, and songbirds live in this habitat. While soils and topography may influence the type of vegetation, the quality of this habitat is influenced most by the density of canopy in the overstory and midstory. As canopy cover increases, the diversity of understory plant species decreases.

Selective thinning, creating forest openings, planting supplemental food plots, prescribed burning, and proper woodland grazing are practices that can improve the quality of this habitat.

The native/introduced grass habitat type in Shelby County is not a natural condition. This habitat develops through the natural succession on abandoned cropland and in cutover areas or through the intentional conversion of cropland or forestland to grassland for hay or grazing. This habitat type normally occurs on the loamy and sandy uplands as well as on some of the better drained bottomland terraces. Typical soils in this habitat type include Attoyac, Hainesville, Bernaldo, Bowie, Besner, Darco, Lilbert, Tenaha, and Betis.

The native grass habitat is usually composed of grasses, forbs, shrubs, and vines. Little bluestem, broomsedge bluestem, switchgrass, partridge pea, tickclover, lespedeza, yankee-weed, giant ragweed, greenbrier, dewberry, and yaupon are common associated plants. This habitat type provides food and cover for turkey, quail, white-tailed deer, cottontail rabbit, coyote, meadowlark, and red-tailed hawk. The native grassland is very important as fawning habitat for deer and nesting habitat for wild turkey.

Introduced grass habitat is much more common in the county and usually consists of either bermudagrass or bahiagrass. These plants are commonly overseeded in the fall to cool-season annual grasses, such as ryegrass and elbon rye, and to cool-season legumes, such as white clover, crimson clover, and arrowleaf clover. These cool-season grasses and legumes provide supplemental food for deer, turkey, rabbits, and geese.

Control of woody vegetation through mowing, application of herbicides, or prescribed burning is essential for the maintenance of this habitat type. Annual disking, supplemental food plots, and controlled grazing are other practices that may be used to maintain or improve habitat quality.

The aquatic habitat of lakes, rivers, and creeks, along with the many farm ponds and watershed structures in the county, provide habitat for largemouth bass, channel catfish, blue catfish, yellow catfish, crappie, and bluegill. Beaver, blue heron, green heron, common egret, cattle egret, wood ducks, and migratory fowl, such as mallards, teal, gadwall, scaups, and redhead ducks, also use the aquatic habitat. Watershed structures and numerous farm ponds in the county also provide aquatic habitat to upland wildlife species, waterfowl, fish, and reptiles. Soils suitable for farm pond construction include Eastwood, Kirvin, Metcalf, and Sacul. Farm ponds are usually stocked with largemouth bass, channel catfish, and bluegills.

Farm ponds in Shelby County may require application of limestone to ensure good production. Other practices useful in maintaining or improving quality pond habitat include aquatic weed control, fertilization, proper fish stocking and harvesting, and the installation of siphon or trickle tubes.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting the appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

Table 12, parts I through V, show the degree and kind of soil limitations that affect various kinds of habitat for wildlife. The table shows limitations of the soils for grain and seed crops for food and cover; domestic grasses and legumes for food and cover; irrigated grain and seed crops for food and cover; irrigated domestic grasses and

legumes for food and cover; habitat for burrowing mammals and reptiles; upland wild herbaceous plants; upland shrubs and vines; upland deciduous trees; upland coniferous trees; upland mixed deciduous-coniferous trees; riparian herbaceous plants; riparian shrubs, vines, and trees; and freshwater wetland plants. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting areas for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the element or kind of habitat. *Not limited* indicates that the soil has features that are very favorable for the element or kind of habitat. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Creating, improving, or maintaining habitat is impractical or impossible.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Ratings for *grain and seed crops for food and cover* can be used in the selection of sites that have the soil properties and plant species necessary to sustain wildlife habitat. The ratings do not reflect the limitation for commercial agronomic production. The soil properties and features that affect the growth of grain and seed crops are soil texture, content of organic matter, the amount of rock fragments on or near the soil surface, available water capacity, depth to bedrock or a cemented pan, soil moisture and temperature regimes, depth to a high water table, ponding, flooding, permeability of the soil surface, slope, presence of excess salts in the soil, and susceptibility of the soil surface to water erosion and wind erosion. Examples of grain and seed crops are corn, wheat, and oats.

Ratings for *domestic grasses and legumes for food and cover* can be used in the selection of sites that have the soil properties and plant species necessary to sustain wildlife habitat. The ratings do not reflect the limitations for commercial agronomic production. The soil properties and features that affect the growth of grasses and legumes are soil texture, content of organic matter, the amount of rock fragments on or near the soil surface, available water capacity, depth to bedrock or a cemented pan, soil moisture and temperature regimes, depth to a high water table, ponding, flooding, permeability of the soil surface, slope, presence of excess salts in the soil, and susceptibility of the soil surface to water erosion and wind erosion. Examples of grasses and legumes are fescue, lovegrass, bahiagrass, clover, and vetch.

Ratings for *irrigated grain and seed crops for food and cover* can be used in the selection of sites that have the soil properties and plant species necessary to sustain wildlife habitat. The ratings do not reflect the limitations for commercial agronomic production. The soil properties and features that affect the growth of grain and seed crops are soil texture, content of organic matter, the amount of rock fragments on or near the soil surface, available water capacity, depth to bedrock or a cemented pan, depth to a high water table, ponding, flooding, permeability of the soil surface, slope, presence of excess salts in the soil, and susceptibility of the soil surface to water

erosion and wind erosion. Examples of grain and seed crops are corn, wheat, and oats.

Ratings for *irrigated domestic grasses and legumes for food and cover* can be used in the selection of sites that have the soil properties and plant species necessary to sustain wildlife habitat. The ratings do not reflect the limitations for commercial agronomic production. The soil properties and features that affect the growth of grasses and legumes are soil texture, content of organic matter, the amount of rock fragments on or near the soil surface, available water capacity, depth to bedrock or a cemented pan, depth to a high water table, ponding, flooding, permeability of the soil surface, slope, presence of excess salts in the soil, and susceptibility of the soil surface to water erosion and wind erosion. Examples of grasses and legumes are fescue, lovegrass, brome grass, and clover.

Ratings for *habitat for burrowing mammals and reptiles* indicate the limitation of the soil for maintaining or increasing local populations of specific burrowing animals. The soil properties and features that affect the preservation of these species are flooding, ponding, depth to bedrock or a cemented pan, depth to a high water table, sandy layers, clayey layers, a high content of organic matter, and high concentrations of rock fragments. Examples of burrowing mammals and reptiles are rabbits, skunks, armadillos, alligators, and rattlesnakes.

Ratings for *upland wild herbaceous plants* indicate the limitation of the soils as a growth medium for a diverse upland herbaceous plant community. This community is adapted to soils that are drier than the common soils in moist riparian and wetland zones but that are not so dry as the soils in upland desert areas. The soil properties and features that affect the ability of these species to thrive include soil texture, available water capacity, the presence of excess salts in the soil, soil moisture and temperature regimes, depth to a high water table, and rock fragments on the soil surface. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, croton, and partridge pea.

Ratings for *upland shrubs and vines* indicate the limitation of the soils as a growth medium for a diverse upland shrub and vine community. This community is adapted to soils that are drier than those common in the moist riparian and wetland zones but that are not so dry as those in upland desert areas. The soil properties and features that affect the ability of these species to thrive include soil texture, content of organic matter, available water capacity, depth to bedrock or a cemented pan, the presence of excess salts in the soil, soil moisture and temperature regimes, depth to a high water table, and rock fragments on the soil surface. Examples of shrubs are American beautyberry, yaupon, sumac, and greenbrier.

Ratings for *upland deciduous trees* indicate the limitation of the soils as a growth medium for a diverse upland deciduous tree community that meets specific local habitat requirements for targeted and nontargeted wildlife species. Typically, deciduous trees require better soil conditions than geographically related conifers. The soil properties and features that affect the ability of upland deciduous trees to thrive include available water capacity, depth to a high water table, depth to bedrock or a cemented pan, and soil moisture and temperature regimes. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn olive, and crabapple.

Ratings for *upland coniferous trees* indicate the limitation of the soils as a growth medium for a diverse upland coniferous tree community that meets specific local habitat requirements for targeted and nontargeted wildlife species. Typically, coniferous trees can subsist under harsher soil conditions than geographically related hardwoods. The soil properties and features that affect the ability of upland coniferous trees to thrive include available water capacity, depth to a high water table, depth to bedrock or

a cemented pan, and soil moisture and temperature regimes. Examples of coniferous plants are pine and eastern redcedar.

Ratings for *upland mixed deciduous-coniferous trees* indicate the limitation of the soils as a growth medium for a diverse upland deciduous-coniferous tree community that meets specific local habitat requirements for targeted and nontargeted wildlife species. A mixed deciduous-coniferous forest can subsist under a wide variety of soil conditions. Typically, better soil conditions are required to maintain the deciduous species, but many of these species adapt to harsher conditions. The soil properties and features that affect the ability of the deciduous and coniferous trees to thrive include available water capacity, depth to a high water table and its seasonal duration, depth to bedrock or a cemented pan, and soil moisture and temperature regimes.

Ratings for *riparian herbaceous plants* indicate the limitation of the soils as a growth medium for herbaceous plants that are adapted to soil conditions that are wetter than those common in the drier upland areas. The soils suitable for this habitat generally are on flood plains, in depressions, on bottom land, in drainageways adjacent to streams, or in any other area where the soil is either saturated for some period during the year or is subject to periodic overflow from ponding or flooding. The soil properties and features that affect the ability of riparian herbaceous plants to persist include soil texture, content of organic matter, depth to a high water table, the frequency and duration of ponding and flooding, the presence of excess salts in the soil, rock fragments, and the soil temperature regime. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, croton, and partridge pea.

Ratings for *riparian shrubs, vines, and trees* indicate the limitation of the soils as a growth medium for shrubs, vines, and trees that are adapted to soil conditions that are wetter than those common in the drier upland areas. The soils suitable for this habitat generally are on flood plains, in depressions, on bottom land, in drainageways adjacent to streams, in areas of springs and seeps, or in any other area where the soil is either saturated for some period during the year or is subject to periodic overflow from ponding or flooding. The soil properties and features that affect the ability of riparian shrubs, vines, and trees to persist include available water capacity, depth to a high water table, the frequency and duration of ponding and flooding, the presence of excess salts in the soil, and the soil temperature regime. Examples of riparian shrubs, vines, and trees are cottonwood and willow.

Ratings for *freshwater wetland plants* indicate the limitation of the soils as a growth medium for plants that are adapted to wet soil conditions. The soils suitable for this habitat generally are in marshes, in depressions, on bottom land, in backwater areas on flood plains, in drainageways adjacent to streams, in areas of springs and seeps, or in any other area where the soil is not directly affected by moving floodwater but may be ponded during some part of the year. The soil properties and features that affect the ability of freshwater wetland plants to persist include soil texture, the content of organic matter, the depth to a high water table, the frequency and duration of ponding, the presence of excess salts in the soil, and soil reaction (pH). Examples of shallow water areas are marshes, waterfowl feeding areas, and beaver ponds.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading "Soil Properties."

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The

information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict the performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 13, parts I and II, show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The

ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water

capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Table 14, parts I and II, show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If

the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Table 15, parts I and II, give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 15, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good, fair, or poor* as potential sources of sand and gravel. A rating of *good or fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated *good, fair, or poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil

performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than

5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine soil properties and characteristics affecting fertility. These results are reported in table 22. Physical and chemical test data for selected soils were also determined. This information is available in tables 23 and 24.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 17 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Soil Properties

Table 18 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 18, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $\frac{1}{3}$ - or $\frac{1}{10}$ -bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential,

available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in micrometers per second (um/sec), when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 18 as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion

by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of rock fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Soil Properties

Table 19 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water.

Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Soil Features

Table 20 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 21 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 21 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 21 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that

it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (11, 12). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 25 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, active, thermic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each

series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (14). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (12) and in "Keys to Soil Taxonomy" (11). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Alazan Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Stream terrace on coastal plain

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Moderately well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 1 percent

Associated Soils

- Dreka and Laneville soils, which are on flood plains
- Eastwood and Meth soils, which have red, clayey subsoils
- Metcalf soils, which are somewhat poorly drained
- Mollville and Guyton soils, which are wetter than the Alazan soils and gray throughout
- Sawtown and Timpson soils, which are better drained than the Alazan soils

Taxonomic Classification

Fine-loamy, siliceous, semiactive, thermic Aquic Glossudalfs

Typical Pedon

Alazan very fine sandy loam in an area of Alazan-Besner complex, 0 to 1 percent slopes, mounded; from the intersection of U.S. Highway 59 and U.S. Highway 84 in Tenaha, 3.1 miles east on U.S. Highway 84 and 0.85 mile southeast on County Road 4492 to a junction, 0.55 mile south on County Road 4550; site is 250 feet east of the road on an intermound in native pasture, in other grass/herbaceous cover; Tenaha East, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 56 minutes 20.10 seconds N. and long. 94 degrees 10 minutes 38.00 seconds W.

A—0 to 5 inches; brown (10YR 4/3) very fine sandy loam; weak fine subangular blocky structure; friable, slightly hard; common fine and medium roots between peds; few fine low continuity tubular pores; 5 percent discontinuous prominent dark brown (10YR 3/3) manganese or iron-manganese stains in root channels and/or pores; moderately acid; clear wavy boundary.

E—5 to 11 inches; pale brown (10YR 6/3) very fine sandy loam; weak fine subangular blocky structure; friable, slightly hard; common fine and medium roots between peds; few fine low continuity tubular pores; 5 percent discontinuous prominent dark brown (10YR 3/3) manganese or iron-manganese stains in root channels and/or pores; 1 percent medium distinct strong brown (7.5YR 5/8) iron-manganese masses on faces of peds; moderately acid; clear wavy boundary.

Bt1—11 to 20 inches; yellowish brown (10YR 5/6) loam; weak medium subangular

blocky structure; friable, slightly hard; common fine and medium roots between peds; 10 percent discontinuous faint clay films on faces of peds; 5 percent medium prominent strong brown (7.5YR 5/6) iron-manganese masses on faces of peds; 10 percent medium distinct light brownish gray (10YR 6/2) iron depletions infused into matrix along ped faces; strongly acid; clear wavy boundary.

Bt2—20 to 37 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; firm, hard; common fine roots between peds; 30 percent discontinuous faint clay films on faces of peds; 8 percent medium prominent red (2.5YR 4/6) masses of oxidized iron on faces of peds; 25 percent medium prominent light brownish gray (10YR 6/2) iron depletions infused into matrix along ped faces; strongly acid; clear wavy boundary.

Btg/E1—37 to 46 inches; grayish brown (10YR 5/2) sandy clay loam; weak coarse subangular blocky structure; firm, hard; common fine roots throughout; 10 percent medium prominent red (2.5YR 4/6) masses of oxidized iron in matrix; 10 percent medium prominent yellowish brown (10YR 5/6) masses of oxidized iron on faces of peds; 20 percent coarse faint light brownish gray (10YR 6/2) clay depletions between peds; strongly acid; clear wavy boundary.

Btg/E2—46 to 80 inches; grayish brown (10YR 5/2) sandy clay loam; weak coarse subangular blocky structure; firm, very hard; few fine roots between peds; 10 percent discontinuous faint clay films on faces of peds; 15 percent medium prominent yellowish brown (10YR 5/6) masses of oxidized iron in matrix; 15 percent coarse faint light brownish gray (10YR 6/2) clay depletions between peds; strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. The weighted average clay content of the particle-size control section ranges from 18 to 25 percent, with a silt content of 25 to 45 percent.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. Texture is typically very fine sandy loam. Reaction ranges from very strongly acid to moderately acid.

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 2 to 4. The content of redoximorphic features in shades of brown, gray, or red ranges from none to common. Texture is very fine sandy loam or loam. Reaction is very strongly acid or strongly acid.

The Bt horizon, if it occurs, has matrix color with hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The content of redoximorphic features in shades of red, yellow, brown, or gray ranges from few to many. Texture is loam or sandy clay loam. Thickness ranges from 0 to 26 inches. Reaction is very strongly acid or strongly acid.

The Bt/E horizon has matrix color with hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The content of redoximorphic features in shades of red, yellow, brown, or gray ranges from few to many. Texture is loam or sandy clay loam in the Bt part and loam, fine sandy loam, or sandy loam in the E part. The upper part of the Bt/E horizon is very strongly acid or strongly acid, and the lower part ranges from strongly acid to slightly acid. The E part, or albic material, makes up 5 to 50 percent of the horizon; however, the glossic horizon (with more than 15 percent albic material) is more than 20 inches thick. In most pedons, 5 to 20 percent of the matrix is brittle.

The Btg/E horizon, if it occurs, has matrix color with hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2. The content of redoximorphic features in shades of red, yellow, brown, or gray is common or many. Texture is loam or sandy clay loam in the Bt part and loam, fine sandy loam, or sandy loam in the E part. Reaction ranges from strongly acid to slightly acid. The E part, or albic material, makes up 5 to 50 percent of the horizon.

Attoyac Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Stream terrace on coastal plain

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 5 percent

Associated Soils

- Austonio and Eastwood soils, which are deep and on side slopes
- Bernaldo and Gallime soils, which have yellowish subsoils
- Besner soils, which are coarse-loamy
- Hainesville soils, which are sandy
- Laneville and Lulus soils, which are on flood plains
- Mollville and Guyton soils, which are gray throughout

Taxonomic Classification

Fine-loamy, siliceous, semiactive, thermic Typic Paleudalfs

Typical Pedon

Attoyac fine sandy loam, 0 to 5 percent slopes; from the intersection of U.S. Highway 84 and Farm Road 2787 east of Joaquin, 2.2 miles south on Farm Road 2787, then east and north on County Road 3344 to Johnson Cemetery, 150 feet north and east on a logging road by the cemetery; site is 50 feet north of the road in woods, in intermixed conifers and hardwoods; Logansport West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 56 minutes 46.50 seconds N. and long. 94 degrees 0 minutes 37.50 seconds W.

- A—0 to 5 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine and common coarse roots throughout; very strongly acid; clear smooth boundary.
- E—5 to 10 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine and common coarse roots throughout; very strongly acid; clear wavy boundary.
- Bt1—10 to 28 inches; red (2.5YR 4/6) fine sandy loam; weak fine subangular blocky structure; friable, slightly hard; many fine and medium roots throughout; 10 percent discontinuous faint clay films on faces of peds; very strongly acid; clear smooth boundary.
- Bt2—28 to 48 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm, hard; common fine and medium roots throughout; very strongly acid; clear smooth boundary.
- Bt3—48 to 62 inches; red (2.5YR 4/6) sandy clay loam; 1 percent medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, hard; 10 percent discontinuous faint clay films on faces of peds; very strongly acid; gradual smooth boundary.
- Bt4—62 to 80 inches; red (2.5YR 4/8) sandy clay loam; 10 percent medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, hard; 10 percent discontinuous faint clay films on faces of peds; very strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Depth to the argillic horizon ranges from 3 to 20 inches. The content of rounded quartzite and ironstone pebbles ranges from 0 to 5 percent, by volume, throughout the profile. The weighted average clay content of the control section ranges from 18 to 25 percent, and the silt content ranges from 20 to 30 percent. Base saturation at 50 inches below the top of the Bt horizon ranges from 35 to 60 percent.

The A horizon has colors in shades of brown or red with hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 2 to 8. Some pedons have dark surface layers with value of 3, but these layers are less than 7 inches thick. Texture typically is fine sandy loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas. Some pedons have a red or dark red BA horizon.

The E horizon, if it occurs, has hue of 5YR to 10YR, value of 5 to 7, and chroma of 3. Texture is fine sandy loam or loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The Bw horizon, if it occurs, has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4. Texture is fine sandy loam or loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The upper part of the Bt horizon has colors in shades of red with hue of 10R to 5YR, value of 3 to 5, and chroma of 6 to 8. Texture is fine sandy loam, loam, or sandy clay loam. Reaction ranges from very strongly acid to moderately acid.

The lower part of the Bt horizon has colors in shades of red or brown with hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 6 to 8. Texture is fine sandy loam, loam, or sandy clay loam. Reaction ranges from very strongly acid to moderately acid. The content of skeletalans, streaks, or pockets of albic material ranges from 0 to less than 5 percent, by volume.

Austonio Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Side slope of stream terrace on coastal plain

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 5 to 12 percent

Associated Soils

- Bernaldo, Attoyac, and Gallime soils, which are very deep
- Eastwood, Cuthbert, and Kirvin soils, which have clayey subsoils
- Laneville, Owentown, and Dreka soils, which are on flood plains
- Latex, Metcalf, Sawtown, and Timpson soils, which have clayey 2Bt horizons

Taxonomic Classification

Fine-loamy, siliceous, active, thermic Typic Hapludalfs

Typical Pedon

Austonio fine sandy loam, 5 to 12 percent slopes; from the intersection of Texas Highway 87 and Farm Road 2694 in Shelbyville, approximately 6.2 miles east on Farm

Road 2694 to the intersection with Farm Road 3471, approximately 0.3 mile south on Farm Road 3471, approximately 1.3 miles south on County Road 2603; site is on west side of a drain in a road cut, in intermixed conifers and hardwoods; Patroon North, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 45 minutes 1.50 seconds N. and long. 93 degrees 59 minutes 2.30 seconds W.

- A—0 to 8 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine to coarse roots; extremely acid; clear smooth boundary.
- E—8 to 16 inches; pale brown (10YR 6/3) fine sandy loam; weak medium subangular blocky structure; friable, soft; many fine to coarse roots; moderately acid; clear smooth boundary.
- Bt1—16 to 27 inches; yellowish brown (10YR 5/6) sandy clay loam; 10 percent fine and medium prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable, slightly hard; many fine and medium roots; 10 percent clay films on faces of peds; 1 percent rounded 0.1- to 3.0-inch ironstone nodules; extremely acid; gradual smooth boundary.
- Bt2—27 to 41 inches; yellowish brown (10YR 5/6) sandy clay loam; 10 percent fine and coarse prominent yellowish red (5YR 4/6) and 10 percent fine and coarse prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, slightly hard; many fine and medium roots; 10 percent clay films on faces of peds; 1 percent rounded 0.1- to 3.0-inch ironstone nodules; extremely acid; gradual smooth boundary.
- Bt3—41 to 53 inches; yellowish brown (10YR 5/6) sandy clay loam; 10 percent medium distinct brownish yellow (10YR 6/8), 10 percent medium prominent red (2.5YR 4/6), 10 percent fine and medium prominent light brownish gray (10YR 6/2), and 10 percent fine and medium prominent light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; firm, slightly hard; common fine and medium roots; 1 percent clay films on faces of peds; extremely acid; gradual smooth boundary.
- BC—53 to 70 inches; brownish yellow (10YR 6/8) sandy clay loam; 10 percent fine and medium prominent red (2.5YR 4/8) and 30 percent medium and coarse prominent light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly hard; common medium roots; extremely acid; gradual smooth boundary.
- 2C—70 to 80 inches; brownish yellow (10YR 6/8) and light brownish gray (10YR 6/2) fine sandy loam; 1 percent fine and medium prominent red (2.5YR 4/8) mottles; massive; firm, hard; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 50 to 80 inches. The average clay content of the control section ranges from 18 to 30 percent. The clay content decreases by 20 percent or more from the maximum within a depth of 40 to 60 inches. Base saturation ranges from 60 to 90 percent in the lower part of the argillic horizon. The content of rounded quartzite or ironstone pebbles is none or few.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. Where value is 3, the horizon is less than 7 inches thick. Texture typically is fine sandy loam. Reaction ranges from extremely acid to slightly acid, except in limed areas.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 4. Some pedons have an EB horizon with chroma of 6 to 8. Texture is fine sandy loam. Reaction ranges from extremely acid to slightly acid.

The Bt1 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8. The content of iron accumulations in shades of red, brown, or yellow ranges from few

to many. Texture is loam or sandy clay loam. Reaction ranges from extremely acid to moderately acid.

The lower Bt horizons have hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. The content of iron accumulations in shades of red, yellow, or brown ranges from few to many, or the horizon is variegated with these colors. The content of lithochromic mottles in shades of gray ranges from none to many. Texture is loam or sandy clay loam. Reaction ranges from extremely acid to moderately acid.

The BC horizon has colors in shades of red, yellow, or brown. Texture is fine sandy loam or loam. Some pedons contain a few streaks or spots of albic material or uncoated sand. Reaction is extremely acid to strongly acid.

The 2C horizon has colors in shades of yellow or brown. Texture is fine sandy loam or loamy fine sand. Some pedons have few streaks or pockets of albic material or uncoated sand. Reaction ranges from extremely acid to slightly acid.

Bernaldo Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Stream terrace on coastal plain

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 0 to 3 percent

Associated Soils

- Gallime, Sawtown, and Besner soils, which have surface layers that are thicker than those of the Bernaldo soils
- Guyton and Mollville soils, which are wetter than the Bernaldo soils and gray throughout
- Laneville and Dreka soils, which are on flood plains
- Metcalf soils, which are somewhat poorly drained
- Sacul and Eastwood soils, which have clayey subsoils

Taxonomic Classification

Fine-loamy, siliceous, semiactive, thermic Glossic Paleudalfs

Typical Pedon

Bernaldo fine sandy loam, 0 to 3 percent slopes; from the intersection of U.S. Highway 96 South and Loop 500 on the south side of Center, approximately 1.3 miles east on Loop 500 to the intersection with Martin L. King Street, approximately 1.85 miles south on Martin L. King Street and County Road 2230 to a road cut on the side of a county road, on the north side of Huana Creek, in intermixed conifers and hardwoods; Center, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 45 minutes 2.00 seconds N. and long. 94 degrees 9 minutes 19.00 seconds W.

A—0 to 5 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; friable, soft; common fine and medium roots; moderately acid; clear smooth boundary.

E—5 to 15 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine

subangular blocky structure; friable, soft; common fine and medium roots; moderately acid; gradual smooth boundary.

Bt1—15 to 27 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable, slightly hard; common medium roots; 10 percent clay films on all faces of peds; 1 percent fine prominent red (2.5YR 4/6) masses of oxidized iron; strongly acid; clear smooth boundary.

Bt2—27 to 41 inches; yellowish brown (10YR 5/4) sandy clay loam; weak medium subangular blocky structure; friable, slightly hard; few medium roots; 10 percent clay films on all faces of peds; 1 percent medium distinct yellowish brown (10YR 5/8) masses of oxidized iron; 3 percent light yellowish brown (10YR 6/4) clay depletions; 10 percent medium and coarse prominent reddish brown (2.5YR 4/4) and 10 percent medium prominent strong brown (7.5YR 5/6) masses of oxidized iron; strongly acid; gradual wavy boundary.

Bt/E—41 to 54 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly hard; 7 percent clay films on all faces of peds; 1 percent fine prominent masses of oxidized iron; 1 percent fine faint yellowish brown (10YR 5/8) and 10 percent medium prominent yellowish red (5YR 5/6) masses of oxidized iron; 8 percent light brownish gray (10YR 6/2) clay depletions; strongly acid; gradual wavy boundary.

BtC/E—54 to 80 inches; light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; firm, hard; 4 percent skeletalans and 5 percent clay films on all faces of peds; 13 percent light brownish gray (10YR 6/2) clay depletions; strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. The content of rounded quartzite or ironstone pebbles is none or few throughout the solum. The weighted average clay content of the particle-size control section ranges from 18 to 25 percent, with a silt content of 25 to 40 percent.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4.

Where the horizon has value of 3 and chroma of 2 or 3, it is less than 7 inches thick. Texture is typically fine sandy loam. Reaction ranges from strongly acid to slightly acid.

The E horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 4. The combined thickness of the A and E horizons ranges from 6 to 20 inches. Texture is fine sandy loam, very fine sandy loam, or loam. Reaction ranges from strongly acid to slightly acid.

Some pedons have an E/B or BE horizon. This horizon is similar to the E horizon, except it has chroma of 6 to 8.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 3 to 8. The content of mottles in shades of red, brown, or gray ranges from none to many. Mottles with chroma of 2 or less are below a depth of 30 inches. Texture is loam, sandy clay loam, or clay loam. Reaction ranges from very strongly acid to slightly acid.

The Bt part of the Bt/E horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 3 to 8. The content of redoximorphic features in shades of brown, red, or gray ranges from few to many. Texture is fine sandy loam, loam, or sandy clay loam. The E part consists of albic material in vertical streaks, pockets, or coatings on the surface of peds. These materials make up 5 to 15 percent of the horizon. Some pedons have as much as 4 percent nodular plinthite. About 5 to 15 percent of the Bt part is brittle. Reaction ranges from very strongly acid to slightly acid.

Some pedons have a BCt/E horizon below the Bt/E horizon. This horizon is similar to the Bt/E horizon but has weaker structure.

Some pedons have a B't or BCt horizon. This horizon has colors in shades of brown, red, yellow, and gray. Texture is fine sandy loam, loam, or sandy clay loam. The

content of streaks, pockets, or coatings of albic material ranges from 0 to 4 percent, by volume. Reaction ranges from very strongly acid to slightly acid.

Besner Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Stream terrace on coastal plain

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 3 percent

Associated Soils

- Alazan and Gallime soils, which have fine-loamy subsoils
- Dreka and Laneville soils, which are on flood plains
- Eastwood soils, which have red clayey subsoils
- Guyton and Mollville soils, which are wetter than the Besner soils and gray throughout
- Metcalf soils, which are somewhat poorly drained
- Sawtown and Timpson soils, which are clayey in the lower part of the subsoil

Taxonomic Classification

Coarse-loamy, siliceous, semiactive, thermic Typic Glossudalfs

Typical Pedon

Besner fine sandy loam, 0 to 3 percent slopes; from the intersection of Texas Highway 7 and Farm Road 139 in Joaquin, 12.5 miles southeast on Farm Road 139, about 0.2 mile east of Farm Road 139 on a logging road just south of a boat ramp, 50 feet south of the logging road in compartment #8 of the Sabine National Forest, in intermixed conifers and hardwoods; Huxley, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 50 minutes 26.40 seconds N. and long. 93 degrees 56 minutes 24.80 seconds W.

A—0 to 5 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common fine to coarse roots throughout; very strongly acid; clear smooth boundary.

E—5 to 13 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common fine to coarse roots throughout; strongly acid; clear smooth boundary.

E/Bt1—13 to 19 inches; 25 percent strong brown (7.5YR 5/6) and 75 percent yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; 5 percent discontinuous faint clay bridging between sand grains; very strongly acid; gradual smooth boundary.

E/Bt2—19 to 51 inches; 40 percent brown (7.5YR 5/4) and 60 percent brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; very friable, soft; 5 percent discontinuous faint clay bridging between sand grains; very strongly acid; clear smooth boundary.

Bt/E—51 to 80 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable, soft; 12 percent faint clay films on all faces of peds; 15 percent light yellowish brown (10YR 6/4) clay depletions; extremely acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. The weighted average clay content of the control section ranges from 12 to 18 percent, and the silt content ranges from 25 to 40 percent. The combined thickness of the A and E horizons is 20 to 40 inches. Texture typically is fine sandy loam. Reaction ranges from extremely acid to slightly acid throughout the profile.

The A horizon has colors in shades of brown with hue of 10YR, value of 3 to 5, and chroma of 2 or 3.

The E horizon has colors in shades of brown or gray with hue of 10YR, value of 5 to 7, and chroma of 2 to 4. The content of redoxmorphic features in shades of yellow, brown, or gray ranges from none to common. Some pedons have a BE horizon with chroma of 6 or more.

A thin E/Bt horizon occurs in some pedons. The E part of this horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4 and is fine sandy loam. The Bt part has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8 and is fine sandy loam, very fine sandy loam, or loam. The Bt part generally makes up 25 to 45 percent of the volume in the E/Bt horizon.

The Bt horizon and the upper part of the Bt/E horizon have matrix colors in shades of brown, red, or yellow, with hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part of the Bt/E horizon has matrix colors in shades of brown, red, yellow, or gray, with hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 8. The content of iron accumulations in shades of red, yellow, or brown is few or common in most pedons. Texture is fine sandy loam, very fine sandy loam, or loam. In some pedons, however, texture is sandy clay loam below a depth of 60 inches. Albic material (E part) makes up 5 to 35 percent of the Bt/E horizon and makes up 15 percent or more in one or more subhorizons of the Bt/E horizon. The Bt part has 5 to 20 percent brittle peds.

Betis Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Broad interstream divide on coastal plain

Parent material: Sandy sediments

Geology: Carrizo Formation

Drainage class: Somewhat excessively drained

Permeability class: Rapid

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 8 percent

Associated Soils

- Darco soils, which have a continuous subsoil below a depth of 40 inches
- Dreka, Laneville, and Iulus soils, which are on flood plains
- Kirvin, Cuthbert, and Maben soils, which have red clayey subsoils
- Lilbert and Tenaha soils, which have surface layers that are 20 to 40 inches thick
- Rentzel soils, which are moderately well drained

Taxonomic Classification

Sandy, siliceous, thermic Lamellic Paleudults

Typical Pedon

Betis loamy fine sand, 0 to 8 percent slopes; from the intersection of Texas Highway 7

Soil Survey of Shelby County, Texas

West and Loop 500 in Center, approximately 8.5 miles southwest on Texas Highway 7 to County Road 1184, beside Mt. Herman Cemetery, approximately 3.2 miles south on County Road 1184, approximately 0.55 mile west on a timber company road, approximately 0.3 mile south on a logging road, 50 feet west of the road in timber, in intermixed conifers and hardwoods; Mount Herman, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 38 minutes 28.34 seconds N. and long. 94 degrees 18 minutes 26.74 seconds W.

A—0 to 7 inches; brown (10YR 5/3) loamy fine sand; single grain; loose; strongly acid; gradual smooth boundary.

Bw—7 to 28 inches; light brown (7.5YR 6/4) loamy fine sand; 10 percent fine and medium faint very pale brown (10YR 7/3) mottles; weak coarse subangular blocky structure; friable, soft; very strongly acid; gradual smooth boundary.

E/Bt1—28 to 43 inches; light yellowish brown (10YR 6/4) loamy fine sand; 1 percent fine and medium faint very pale brown (10YR 7/4) mottles; weak coarse subangular blocky structure; friable, soft; 3 percent, by volume, thin yellowish red (5YR 4/6) lamellae and spots; very strongly acid; gradual smooth boundary.

E/Bt2—43 to 55 inches; yellowish brown (10YR 5/4) loamy fine sand; weak coarse subangular blocky structure; friable, soft; 15 percent, by volume, yellowish red (5YR 4/6) and strong brown (7.5YR 4/6) fine sandy loam lamellae ($\frac{1}{2}$ inch thick) and spots; very strongly acid; gradual smooth boundary.

E/Bt3—55 to 80 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak coarse subangular blocky structure; friable, soft; 25 percent, by volume, yellowish red (5YR 5/6) fine sandy loam lamellae ($\frac{3}{4}$ inch to 2 inches thick); very strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Reaction ranges from very strongly acid to moderately acid in limed areas. Texture of the matrix is fine sand or loamy fine sand. Base saturation ranges from 20 to 35 percent. The soil is dry in some part of the moisture-control section for 75 to 90 cumulative days in most years.

The A horizon is dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/4), or brown (10YR 4/3, 10YR 5/3, 7.5YR 4/2, 7.5YR 4/4, 7.5YR 5/4). Texture typically is loamy fine sand.

A thin E horizon occurs in some pedons. It has hue of 10YR, value of 5 to 7, and chroma of 3. Texture is fine sand or loamy fine sand.

The Bw horizon, if it occurs, is strong brown (7.5YR 5/4, 5/6, 5/8, 6/4) or yellowish brown (10YR 5/4, 5/6, 5/8). The content of randomly distributed pockets of clean sand grains is few or common.

The E part of the E/Bt horizon is brown (10YR 5/3), pale brown (10YR 6/3), very pale brown (10YR 7/3, 7/4), light yellowish brown (10YR 6/4), or yellowish brown (10YR 5/4). The Bt part (lamellae) is strong brown (7.5YR 5/6, 5/8) or yellowish brown (10YR 5/6, 5/8). The lamellae are loamy fine sand or fine sandy loam. Their composite thickness is more than 6 inches within a depth of 80 inches. Some pedons have a continuous Bt horizon of loamy fine sand in addition to lamellae.

Bonn Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Open depression on stream terrace

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Poorly drained

Soil Survey of Shelby County, Texas

Permeability class: Impermeable

Depth class: Very shallow to a natric layer

Shrink-swell potential: Low

Slope range: 0 to 1 percent

Associated Soils

- Bernaldo and Gallime soils, which are fine-loamy and better drained than the Bonn soils
- Besner, Sawtown, and Timpson soils, which are better drained than the Bonn soils
- Cart soils, which are coarse-loamy and on mounds
- Dreka and Laneville soils, which are on flood plains
- Metcalf soils, which are somewhat poorly drained
- Mollville soils, which are fine-loamy

Taxonomic Classification

Fine-silty, mixed, superactive, thermic Glossic Natraqualfs

Typical Pedon

Bonn silt loam; from the intersection of Texas Highway 84 and Farm Road 3174 between Joaquin and Haslam, north and west on Farm Road 3174, about 0.75 mile to the intersection with Faulkville Road (a Joaquin city street), approximately 0.6 mile west on Faulkville Road (west of the city wastewater plant), 45 feet north of the road in an open field newly planted to pines, in other grass/herbaceous cover; Logansport West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 58 minutes 7.69 seconds N. and long. 94 degrees 2 minutes 55.69 seconds W.

Ap—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable, loose, nonsticky, nonplastic; many fine roots throughout; 2 percent fine distinct irregular strong brown (7.5YR 5/6) masses of oxidized iron throughout; very strongly acid; clear smooth boundary.

Eg—3 to 13 inches; grayish brown (10YR 5/2) silt loam; weak fine subangular blocky structure; friable, moderately hard, nonsticky, nonplastic; common fine roots throughout; common very fine low continuity tubular pores; 3 percent, by volume, krotovinas; 8 percent fine distinct irregular strong brown (7.5YR 5/6) masses of oxidized iron on faces of peds; 15 percent fine distinct irregular yellowish brown (10YR 5/6) masses of oxidized iron lining pores; strongly acid; gradual wavy boundary.

E/Btng—13 to 31 inches; 40 percent dark grayish brown (10YR 4/2) and 60 percent light brownish gray (10YR 6/2) silt loam; weak fine subangular blocky structure; very firm, moderately hard, nonsticky, nonplastic; common fine roots in cracks; 60 percent, by volume, krotovinas; 1 percent faint dark grayish brown (10YR 4/2) clay films on all faces of peds; 1 percent fine faint spherical very dark gray (10YR 3/1) iron-manganese concretions throughout; 1 percent fine faint dendritic dark yellowish brown (10YR 4/4) masses of oxidized iron lining pores; 2 percent fine irregular white (10YR 8/1) barite masses between peds; many dark gray (10YR 4/1) clay cups at bottom of krotovinas; very strongly acid; clear wavy boundary.

Btng/E—31 to 42 inches; 40 percent light brownish gray (10YR 6/2) and 60 percent dark grayish brown (10YR 4/2) clay loam; moderate medium subangular blocky structure; very firm, moderately hard, slightly sticky, slightly plastic; common fine roots between peds; 40 percent, by volume, krotovinas; 1 percent faint dark grayish brown (10YR 4/2) clay films on all faces of peds and 10 percent faint light brownish gray (10YR 6/2) silt coats on all faces of peds; 1 percent fine distinct irregular very dark gray (10YR 3/1) manganese coatings; 10 percent fine faint irregular dark yellowish brown (10YR 4/6) masses of oxidized iron; 3 percent fine

irregular white (10YR 8/1) barite masses between peds; many dark gray (10YR 4/1) clay cups at bottom of krotovinas; neutral; gradual wavy boundary.

Btng1—42 to 56 inches; gray (10YR 5/1) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm, slightly sticky, slightly plastic; common fine moderate continuity tubular pores; 3 percent distinct light brownish gray (10YR 6/2) clay films on all faces of peds and 3 percent faint gray (10YR 5/1) silt coats on all faces of peds; 3 percent medium distinct irregular strong brown (7.5YR 5/6) and 20 percent medium distinct irregular yellowish brown (10YR 5/6) masses of oxidized iron on faces of peds; 3 percent fine threadlike white (10YR 8/1) barite masses between peds; neutral; gradual wavy boundary.

Btng2—56 to 68 inches; gray (2.5Y 5/1) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm, moderately sticky, moderately plastic; 1 percent distinct light brownish gray (10YR 6/2) silt coats on all faces of peds; 3 percent prominent strong brown (7.5YR 4/6) and 3 percent faint grayish brown (2.5Y 5/2) clay films on all faces of peds; 1 percent fine distinct irregular very dark gray (10YR 3/1) manganese coatings on faces of peds; 8 percent medium prominent irregular strong brown (7.5YR 5/6) and 20 percent medium distinct irregular yellowish brown (10YR 5/6) masses of oxidized iron on faces of peds; 2 percent fine threadlike white (10YR 8/1) barite masses; slightly alkaline; gradual wavy boundary.

Btng3—68 to 83 inches; gray (2.5Y 5/1) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm, moderately sticky, moderately plastic; 1 percent faint light brownish gray (10YR 6/2) silt coats on all faces of peds and 3 percent distinct pressure faces; 3 percent distinct red (2.5YR 4/6) and 3 percent distinct grayish brown (2.5Y 5/2) clay films on all faces of peds; 1 percent fine distinct irregular very dark gray (10YR 3/1) manganese masses; 8 percent medium prominent irregular red (2.5YR 4/6) and 25 percent fine distinct irregular yellowish brown (10YR 5/4) masses of oxidized iron; slightly alkaline.

Range in Characteristics

The thickness of the solum ranges from 40 to 60 inches. Exchangeable sodium saturation ranges from 15 to 50 percent in all horizons below a depth of 16 inches.

The Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 3. It is typically silt loam. Reaction ranges from very strongly acid to neutral.

The E horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 1 or 2. It is silt loam or very fine sandy loam. Reaction ranges from very strongly acid to neutral. Tongues of the E horizon extend into the lower part of the Bt horizon. A few accumulations of very dark or dark gray clay typically occur in discontinuous varve-like bands within the E horizon or as coatings on the tops and sides of prisms or columns.

The upper part of the Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. The lower part has the same color range as the upper part or has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. Redoximorphic features are in shades of yellow, brown, or gray. The Bt horizon ranges from moderately acid to strongly alkaline. It is silt loam, silty clay loam, or clay loam. The amount of carbonate concretions in subhorizons of the B horizon ranges from 0 to 10 percent.

The C horizon has the same range in colors and textures as the Bt horizon. Reaction is neutral to strongly alkaline.

Bowie Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Interfluvium on coastal plain

Parent material: Loamy marine sediments



Figure 10.—A profile of Bowie fine sandy loam.

Geology: Carrizo and Reklaw Formations

Drainage class: Well drained

Permeability class: Moderately slow

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 1 to 5 percent

Associated Soils

- Iulus and Laneville soils, which are on flood plains
- Kirvin, Maben, and Cuthbert soils, which have red clayey subsoils
- Lilbert, Darco, Rentzel, and Tenaha soils, which have thick sandy surface layers

Taxonomic Classification

Fine-loamy, siliceous, semiactive, thermic Plinthic Paleudults

Typical Pedon

Bowie fine sandy loam, 1 to 5 percent slopes (fig. 10); from the intersection of Texas

Soil Survey of Shelby County, Texas

Highway 7 and Loop 500 on the southwest side of Center, approximately 9.5 miles south on Texas Highway 7 to the intersection with County Road 1184 at Mt. Herman Cemetery, approximately 0.35 mile on County Road 1184 to a fork, 0.3 mile south on County Road 1187; site is in road cut on west side of the road, in conifers; Mount Herman, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 41 minutes 16.40 seconds N. and long. 94 degrees 18 minutes 26.10 seconds W.

- A—0 to 9 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; very friable, soft; 5 percent 0.1- to 3.0-inch ironstone nodules; slightly acid; clear smooth boundary.
- E—9 to 17 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; 5 percent 0.1- to 3.0-inch ironstone nodules; moderately acid; clear wavy boundary.
- Bt—17 to 25 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly hard; 6 percent clay films on faces of peds; strongly acid; clear wavy boundary.
- Btv—25 to 41 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, hard; 7 percent, by volume, plinthite; 9 percent clay films on faces of peds; 7 percent medium prominent spherical weakly cemented red (2.5YR 4/6) plinthite nodules infused into matrix along ped faces with sharp boundaries; 15 percent medium prominent spherical red (2.5YR 4/8) masses of oxidized iron infused into matrix along ped faces with sharp boundaries; strongly acid; clear wavy boundary.
- Btv/E—41 to 80 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, hard; 10 percent, by volume, plinthite; 10 percent clay films on faces of peds; 7 percent light brownish gray (10YR 6/2) clay depletions; 10 percent medium prominent spherical moderately cemented red (2.5YR 4/6) plinthite nodules infused into matrix along ped faces with sharp boundaries; 30 percent medium prominent spherical red (2.5YR 4/8) masses of oxidized iron infused into matrix along ped faces with clear boundaries; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 60 to more than 80 inches. Depth to horizons that contain 5 percent or more plinthite, by volume, ranges from 25 to 60 inches. The content of strongly cemented or indurated iron oxide concretions and ironstone pebbles that are less than 3 inches in diameter ranges from 0 to 5 percent, by volume, throughout the profile. Base saturation at a depth of 50 inches below the top of the argillic horizon ranges from 10 to 34 percent. The cation-exchange capacity ranges from 6.0 to 18.0 meg/100 gram of soil. The moisture-control section is dry in some part of the profile for 75 to 90 days in most years. The weighted average clay content of the control section ranges from 18 to 30 percent, and the silt plus very fine sand content ranges from 30 to 60 percent. The sand fraction coarser than very fine sand and the content of fragments that are as much as 3 inches across range from 15 to 45 percent. The content of brittle masses or fragments ranges from 5 to 40 percent, by volume, in horizons containing plinthite. The content of fragments that are more than 3 inches in size is none or few.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Where value is 3, the horizon is less than 7 inches thick. Texture typically is fine sandy loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. Some pedons have an EB or BE horizon with chroma of 6. Texture is very fine sandy loam, fine sandy loam, or loamy fine sand. The combined thickness of the A and E horizons is 6 to 20 inches. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8.

The content of reddish, brownish, or yellowish redoximorphic concentrations ranges from none to many. The content of streaks, coatings, or pockets of uncoated sand ranges from 0 to about 4 percent. The content of nodular plinthite ranges from 0 to 4 percent, by volume. Texture is fine sandy loam, loam, sandy clay loam, or clay loam. Reaction is very strongly acid or strongly acid, except in limed areas.

The Btv horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8.

The content of reddish and brownish redoximorphic concentrations ranges from few to many in most pedons. Some pedons have redoximorphic depletions below a depth of 30 inches. The content of coatings, streaks, or pockets of albic material ranges 1 to 4 percent, by volume. The content of nodular plinthite ranges from about 5 to 15 percent, by volume. Texture is fine sandy loam, loam, sandy clay loam, or clay loam. Reaction is very strongly acid or strongly acid.

The Btv/E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The content of redoximorphic features in shades of red, yellow, or gray ranges from few to many, or the matrix is mixed with these colors. Most of the grayish colors are albic material occurring as coatings, streaks, or pockets. The content of albic material ranges from about 5 to 20 percent, by volume (E part). The content of plinthite, mainly in nodular form, ranges from 5 to about 15 percent, by volume. Texture is fine sandy loam, loam, clay loam, or sandy clay loam. Reaction is very strongly acid or strongly acid.

The B't or BC horizon, if it occurs, has colors in shades of brown or gray with yellowish or reddish redoximorphic concentrations, or the matrix is mixed or stratified with these colors. In some pedons the content of streaks or pockets of albic material is as much as 4 percent, by volume. The content of plinthite ranges from 0 to 4 percent, by volume. Texture is sandy clay loam, clay loam, or sandy clay. Some pedons have strata of fine sandy loam or clay. The weighted average clay content ranges from 25 to 40 percent. Reaction is very strongly acid or strongly acid.

Some pedons have a C horizon of sandstone or stratified sandstone and shale/mudstone below a depth of 60 inches. Texture is fine sandy loam, sandy clay loam, or sandy clay. Colors are mainly in shades of red, yellow, or brown. Reaction is very strongly acid or strongly acid.

Cart Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Mound on stream terrace

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Well drained

Permeability class: Slow

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 0 to 2 percent

Associated Soils

- Bernaldo soils, which have fine-loamy subsoils
- Besner soils, which do not have a fragipan
- Guyton and Mollville soils, which are wetter than the Cart soils and gray throughout
- Iulus, Dreka, and Laneville soils, which are on flood plains
- Sawtown, Timpson, and Metcalf soils, which are clayey in the lower part of the subsoil

Taxonomic Classification

Coarse-loamy, siliceous, semiactive, thermic Fragic Glossudalfs

Typical Pedon

Cart very fine sandy loam; from the intersection of Texas Highway 84 and Farm Road 3174 between Joaquin and Haslam, 0.7 mile north and west on Farm Road 3174 to Faulkville Road (a Joaquin city street), 0.6 mile west on Faulkville Road (0.1 mile west of a wastewater treatment plant), 40 feet north of the road on a mound, in other grass/herbaceous cover; Logansport West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 58 minutes 7.78 seconds N. and long. 94 degrees 2 minutes 54.83 seconds W.

- Ap—0 to 4 inches; brown (10YR 4/3) very fine sandy loam; weak fine granular structure; very friable; many fine, many medium, and common coarse roots throughout; very strongly acid; gradual wavy boundary.
- E—4 to 11 inches; brown (10YR 5/3) very fine sandy loam; weak fine subangular blocky structure; very friable; many fine, common medium, and common coarse roots throughout; common fine low continuity tubular pores; 1 percent dark grayish brown (10YR 4/2) insect casts; 1 percent (10YR 2/1) charcoal fragments; strongly acid; clear smooth boundary.
- EB—11 to 17 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable, moderately hard; many fine and common medium roots throughout; common fine low continuity tubular pores; 3 percent fine irregular strong brown (7.5YR 5/6) masses of oxidized iron throughout; very strongly acid; gradual wavy boundary.
- Bt—17 to 33 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; firm, very hard; many fine and common medium roots between peds; many fine and many medium high continuity tubular pores; 3 percent distinct light brownish gray (10YR 6/2) silt coats on all faces of peds and 5 percent distinct grayish brown (10YR 5/2) clay films on surfaces along pores; 1 percent fine spherical black (10YR 2/1) iron-manganese concretions on faces of peds; 1 percent fine spherical red (2.5YR 4/6) and 5 percent fine irregular brown (7.5YR 4/4) masses of oxidized iron on faces of peds; horizon is 25 percent brittle; very strongly acid; clear smooth boundary.
- Btx—33 to 57 inches; yellowish brown (10YR 5/6) loam; massive parting to weak medium subangular blocky structure; very firm, extremely hard; common fine and common medium roots between peds; many fine and many medium high continuity tubular pores; 3 percent prominent light brownish gray (10YR 6/2) silt coats on all faces of peds and 5 percent faint grayish brown (10YR 5/2) clay films on surfaces along pores; 1 percent medium irregular red (2.5YR 4/6) plinthite nodules on faces of peds; 8 percent medium irregular red (2.5YR 4/6) and 15 percent medium irregular strong brown (7.5YR 4/6) masses of oxidized iron on faces of peds; 30 percent medium irregular grayish brown (10YR 5/2) iron depletions on faces of peds; horizon is 50 percent brittle; very strongly acid; gradual irregular boundary.
- Btx/E—57 to 65 inches; yellowish brown (10YR 5/4) loam; massive parting to weak medium subangular blocky structure; firm, very hard; common fine and common medium roots between peds; common very fine low continuity tubular pores; 5 percent faint yellowish brown (10YR 5/4) clay films on all faces of peds; 1 percent medium irregular red (2.5YR 4/6) plinthite nodules on faces of peds; 10 percent medium irregular red (2.5YR 4/6) and 15 percent medium irregular strong brown (7.5YR 5/6) masses of oxidized iron on faces of peds; 40 percent light brownish gray (10YR 6/2) clay depletions; horizon is 50 percent brittle in Btx part; very strongly acid; clear smooth boundary.

2Btg—65 to 80 inches; gray (10YR 5/1) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm, very hard, moderately sticky, moderately plastic; common medium roots throughout and common very fine roots between peds; common very fine low continuity tubular pores; 1 percent distinct light gray (10YR 7/1) silt coats on all faces of peds and 5 percent distinct dark gray (10YR 4/1) clay films on all faces of peds; 7 percent medium irregular strong brown (7.5YR 4/6) and 25 percent medium irregular red (2.5YR 4/6) masses of oxidized iron on faces of peds; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 60 to more than 80 inches. Depth to fragic properties is more than 30 inches. Depth to a fragipan with more than 60 percent brittle peds ranges from 40 to 57 inches. The fragipan generally grades from minimal to maximal as depth increases. Some subhorizon of the Bt/E or Btx/E horizon that is at least 2 inches thick has more than 15 percent intrusions of albic material. Base saturation at 30 inches below the top of the fragipan ranges from 35 to 50 percent. The combined thickness of the A, E, and EB horizons ranges from 17 to 40 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Texture typically is very fine sandy loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The E and EB horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. Some EB horizons have chroma of 6 and common or many reddish or brownish masses of iron accumulation. Texture is fine sandy loam, very fine sandy loam, or loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas.

A Bt horizon occurs in some pedons. It has hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. The content of masses of iron accumulation in shades of brown, yellow, or red ranges from none to many. Intrusions of albic material are less than 5 percent. Texture is fine sandy loam, very fine sandy loam, or loam. Reaction is very strongly acid or strongly acid.

The Bt/E horizon, if it occurs, has hue of 10YR to 5YR, value of 4 to 6, and chroma of 6 to 8. The content of masses of iron accumulations in shades of brown, yellow, or red ranges from none to common. Texture is fine sandy loam, very fine sandy loam, or loam. The clay content of the control section ranges from 10 to 18 percent, and the silt content ranges from 20 to 50 percent. The content of vertical intrusions of albic material of very fine sand or fine sand (E part) ranges from 5 to 40 percent, by volume, in the upper part of the Bt/E horizon but is more than 15 percent in some subhorizon at least 2 inches thick. The content of slightly brittle masses ranges from 0 to 40 percent, by volume. Reaction is typically very strongly acid or strongly acid; however, it ranges to moderately acid.

The upper part of the Btx or Btx/E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. The content of masses of iron accumulation in shades of brown or red and iron or clay depletions in shades of gray ranges from few to many. Texture is sandy clay loam, clay loam, loam, or fine sandy loam in the Bt part of the Btx/E horizon and loam or fine sandy loam in the E part. Intrusions of albic material make up 3 to 10 percent, by volume, of the matrix. The average clay content for the horizon ranges from 15 to 27 percent. About 50 to 80 percent of the matrix is slightly to moderately brittle. The content of plinthite nodules ranges from 0 to 4 percent, by volume. Reaction is very strongly acid or strongly acid.

The lower part of the Btx/E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8. The content of masses of iron accumulation in shades of red, yellow, or brown and iron or clay depletions in shades of gray ranges from few to many, and some horizons have a variegated matrix of these colors. Texture is sandy clay loam, clay loam, loam, or fine sandy loam in the Bt part and loam or fine sandy loam in the E

part. Albic material along vertical polygonal prisms makes up 5 to 40 percent, by volume, of the matrix but makes up more than 15 percent in some subhorizon at least 2 inches thick. The average clay content for the horizon ranges from 15 to 27 percent. About 60 to 90 percent of the matrix is moderately to strongly brittle. The content of plinthite nodules ranges from 0 to 4 percent, by volume. The content of fine to coarse pores is common or many. Reaction is very strongly acid or strongly acid.

The Bt/E' horizon, if it occurs, has colors and reaction similar to the lower part of the Btx/E horizon. Texture is sandy clay loam, clay loam, or sandy clay.

A 2BC horizon typically occurs at a depth of 80 to 120 inches. Colors are in shades of red and gray. Texture is clay loam or clay. These clayey materials appear to be the upper part of the Wilcox Formation. Reaction is very strongly acid or strongly acid. The 2BC horizon is considered to be the restrictive layer that contributed to the formation of the fragipan.

The 2Btg horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The content of masses of iron accumulation in shades of brown or red ranges from few to many. Texture is clay loam or clay. Reaction is very strongly acid or strongly acid.

Cuthbert Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Side slope of drainageway on coastal plain

Parent material: Interbedded sandstone and shale

Geology: Carrizo and Reklaw Formations

Drainage class: Well drained

Permeability class: Slow

Depth class: Moderately deep to a layer of densic material

Shrink-swell potential: Moderate

Slope range: 5 to 15 percent

Associated Soils

- Darco soils, which have sandy surface layers more than 40 inches thick
- Dreka, Laneville, and Iulus soils, which are on flood plains
- Kirvin, Sacul, and Eastwood soils, which are 40 to 60 inches deep
- Lilbert, Rentzel, and Tenaha soils, which have thick sandy surface layers

Taxonomic Classification

Fine, mixed, semiactive, thermic Typic Hapludults

Typical Pedon

Cuthbert fine sandy loam, 5 to 15 percent slopes; from the intersection of Farm Road 2140 and U.S. Highway 96 south of Center, 0.15 mile south on U.S. Highway 96 to the intersection with County Road 1015, approximately 0.3 mile southwest on County Road 1015 to the intersection with a timber company access road, 0.7 mile southwest on the timber company road to a fork, 0.65 mile southwest on the left road of the fork, 150 feet north of the road on a side slope in timber, in intermixed conifers and hardwoods; Neuville, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 39 minutes 30.60 seconds N. and long. 94 degrees 11 minutes 3.30 seconds W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine and medium roots and common coarse roots; 20 percent fine sand; 5 percent medium sand; 33 percent very fine sand; moderately acid; clear smooth boundary.

- Bt1—5 to 14 inches; red (2.5YR 4/6) clay; 1 percent medium distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm, hard; common fine and many medium roots; 10 percent clay films on faces of peds; strongly acid; gradual smooth boundary.
- Bt2—14 to 20 inches; red (2.5YR 4/8) clay; 10 percent medium faint red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, hard; common fine and medium roots; common fine pores; 10 percent clay films on faces of peds; 10 percent 0.1- to 0.8-inch shale fragments; common very pale brown (10YR 7/3), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) shale bits; very strongly acid; gradual smooth boundary.
- BtC—20 to 30 inches; 30 percent red (2.5YR 4/6), 30 percent reddish brown (5YR 4/4), and 40 percent light gray (10YR 7/2) clay loam; 1 percent fine prominent brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm, hard; common medium roots; common medium pores; 1 percent clay films on faces of peds; very strongly acid; gradual smooth boundary.
- C—30 to 41 inches; 30 percent strong brown (7.5YR 5/8), 35 percent light gray (10YR 7/1), and 35 percent yellowish brown (10YR 5/6) clay loam; massive; firm, hard; common medium roots in cracks; horizon is alternating soft layers of shale and sandstone; extremely acid; clear smooth boundary.
- Cd—41 to 80 inches; light gray (10YR 7/2) weathered bedrock; platy structure; firm, hard; extremely acid.
- Cr—80 inches; shale with few thin (7.5YR 5/6) sandstone strata.

Range in Characteristics

The thickness of the solum ranges from 20 to 40 inches. Base saturation in the Bt and Bt/C horizons ranges from 10 to 30 percent, and the calcium-magnesium ratio is less than 1. The clay content of the particle-size control section ranges from 35 to 60 percent, and the silt content is less than 30 percent.

Ironstone and sandstone fragments on or partially imbedded in the A horizon cover less than 1 percent to about 20 percent of the surface. These are mainly flat, angular fragments 1 to 6 inches thick and 3 to 36 inches across the longest axis.

The content of fragments less than 3 inches in diameter ranges from less than 2 percent to about 50 percent, by volume, in the A and E horizons. Coarse fragments make up less than 15 percent of the Bt, BtC, and C horizons.

The A horizon has hue of 7.5YR or 10YR. It has value of 3 to 5 and chroma of 2 to 4 or value of 3 and chroma of 1. Texture typically is fine sandy loam or its stony or gravelly counterparts. Reaction ranges from very strongly acid to slightly acid.

The E horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. Texture is loamy fine sand or fine sandy loam or their stony or gravelly counterparts. Reaction ranges from very strongly acid to slightly acid. A graded phase in which the surface layer and subsurface layer have been removed is also recognized.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 to 8. In some pedons, the horizon has few or common yellowish or brownish redoximorphic concentrations. Grayish or brownish horizontally oriented weathered shale fragments or strata are in the lower part of the horizon in many pedons. Texture is sandy clay loam, clay loam, sandy clay, or clay. Reaction ranges from extremely acid to strongly acid.

The BtC or BCt horizon has reddish, brownish, or yellowish colors and is stratified or variegated with these and grayish colors. The degree of weathering is variable, and some pedons have a BCt horizon with only a few visible fragments of parent material. Texture is fine sandy loam, sandy clay loam, clay loam, or clay, with or without strata of weathered sandstone and shaly materials. Reaction ranges from extremely acid to strongly acid.

The C or Cd horizon is stratified weakly consolidated sandy clay loam, fine sandy loam, clay loam, weakly cemented sandstone, and shaly soil materials. The loamy materials and sandstone are reddish, yellowish, or brownish, and the shaly materials are mainly grayish clay. The amount of sandstone or shaly materials is variable, and both may be absent in some pedons. Roots penetrate the materials but are concentrated along fractures or cleavage planes. Most pedons have clay flows along some vertical fractures. Many pedons have discontinuous, fractured, strongly cemented or indurated sandstone layers about 1 inch to 4 inches thick. The layers appear to have the slope of an ancient surface gradient and are also within the B horizon of some pedons. Reaction is extremely acid or very strongly acid.

Darco Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Interfluvium on coastal plain

Parent material: Sandy and loamy sediments

Geology: Carrizo Formation

Drainage class: Somewhat excessively drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 1 to 8 percent

Associated Soils

- Betis soils, which are sandy throughout
- Bowie soils, which are loamy throughout
- Dreka, Laneville, and Iulus soils, which are on flood plains
- Kirvin, Cuthbert, and Maben soils, which have red clayey subsoils
- Lilbert, Rentzel, and Tenaha soils, which have surface layers that are thinner than those of the Darco soils

Taxonomic Classification

Loamy, siliceous, semiactive, thermic Grossarenic Paleudults

Typical Pedon

Darco loamy fine sand, 1 to 8 percent slopes (fig. 11); from the intersection of Loop 500 and Texas Highway 7 West in Center, 4.0 miles southwest on Texas Highway 7 to Farm Road 711, about 0.5 mile south on Farm Road 711 to County Road 1265, about 0.5 mile southeast on County Road 1265, about 0.15 mile north in a tamed pasture of coastal bermudagrass; Neuville, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 44 minutes 5.00 seconds N. and long. 94 degrees 13 minutes 4.60 seconds W.

Ap—0 to 5 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable, soft; common fine and medium roots throughout; 4 percent yellowish red (5YR 5/6) clay bridging between sand grains; strongly acid; clear smooth boundary.

E1—5 to 21 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine granular structure; very friable, soft; common fine and medium roots throughout; moderately acid; clear smooth boundary.

E2—21 to 62 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine granular structure; very friable, soft; common medium roots throughout; few thin yellowish red lamellae; strongly acid; clear smooth boundary.

Bt—62 to 80 inches; yellowish red (5YR 5/6) fine sandy loam; weak fine subangular



Figure 11.—A profile of Darco loamy fine sand.

blocky structure; very friable, soft; common medium roots throughout; 5 percent clay bridging between sand grains; very strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Base saturation ranges from 15 to 35 percent in the lower part of the Bt horizon. The exchangeable calcium content ranges from 1 to 3 meq/100 grams of soil. The sand fraction contains less than 10 percent coarse sand or very coarse sand.

The combined thickness of the A and E horizons ranges from 40 to 72 inches. Texture typically is loamy fine sand. The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is very strongly acid to slightly acid, except in limed areas. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. Some pedons have a BE horizon with chroma of 6 or more. Reaction is very strongly acid to slightly acid.

The Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. The content of redoximorphic concentrations in shades of brown, yellow, or red ranges from none to common. Redoximorphic depletions with chroma of 2 or less are below a depth of 50 inches in some pedons. Texture is fine sandy loam or sandy clay loam; however, clay loam also occurs below a depth of 60 inches in some pedons. The clay

content ranges from 12 to 35 percent. Reaction is very strongly acid or strongly acid, except in limed areas. The content of plinthite ranges from 0 to 5 percent.

Dreka Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Flood plain on coastal plain

Parent material: Loamy and clayey alluvium

Geology: Alluvium

Drainage class: Somewhat poorly drained

Permeability class: Slow

Depth class: Very deep

Shrink-swell potential: High

Slope range: 0 to 1 percent

Associated Soils

- A similiar soil that is fine-loamy
- A wetter, mucky soil that occurs in old sloughs and oxbows
- An unnamed sandy soil that has a black mucky surface layer
- Iulus and Owentown soils, which have coarser textures throughout
- Laneville soils, which are drier and browner

Taxonomic Classification

Fine-silty, siliceous, active, nonacid, thermic Fluvaquentic Epiaquepts

Typical Pedon

Dreka loam, 0 to 1 percent slopes, frequently flooded; from the square in Center, north 7.5 miles on Farm Road 699; site is 50 feet west of Farm Road 699 on the flood plain of Flat Fork Creek, south of the channel, in hardwoods; Tenaha East, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 53 minutes 18.80 seconds N. and long. 94 degrees 9 minutes 21.60 seconds W.

A—0 to 9 inches; grayish brown (10YR 5/2) loam; moderate fine subangular blocky structure; firm, hard; common fine and medium roots throughout; 10 percent patchy distinct dark yellowish brown (10YR 4/4) iron stains on surfaces along pores and 10 percent patchy distinct dark yellowish brown (10YR 4/6) iron stains on surfaces along root channels; moderately acid; clear smooth boundary.

Bg1—9 to 13 inches; light brownish gray (2.5Y 6/2) clay loam; moderate medium subangular blocky structure; firm, hard; 10 percent medium prominent yellowish brown (10YR 5/6) masses of oxidized iron; moderately acid; gradual smooth boundary.

Bg2—13 to 30 inches; light brownish gray (2.5Y 6/2) clay loam; moderate medium subangular blocky structure; firm, hard; 1 percent fine prominent yellowish brown (10YR 5/8) and 10 percent medium distinct light olive brown (2.5Y 5/6) masses of oxidized iron; moderately acid; gradual smooth boundary.

Bg3—30 to 43 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm, very hard; 1 percent iron-manganese masses; 1 percent fine distinct yellowish brown (10YR 5/8) and 10 percent medium distinct dark yellowish brown (10YR 4/4) masses of oxidized iron; slightly acid; gradual smooth boundary.

2Bg4—43 to 80 inches; grayish brown (2.5Y 5/2) clay; moderate medium subangular blocky structure; very firm, very hard; 1 percent iron-manganese masses; 10

percent fine faint light olive brown (2.5Y 5/4) masses of oxidized iron; 2 percent fine platy gypsum crystals between peds; slightly alkaline.

Range in Characteristics

The solum is more than 80 inches thick. Average clay content of the control section ranges from 18 to 30 percent. Reaction ranges from moderately acid to slightly alkaline throughout the profile. The content of iron-manganese concretions and masses ranges from few to many throughout the profile. Depth to the discontinuity containing more than 35 percent clay ranges from 40 to 60 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The content of redoximorphic features in shades of gray, brown, or yellow ranges from few to many. Texture typically is loam. Electrical conductivity ranges from 0 to 2.0 dS/m.

The Bw horizon, if it occurs, has hue of 10YR or 2.5Y. It has value of 5 and chroma of 3 or 4 or value of 6 and chroma of 4. The horizon is typically 4 to 6 inches thick, and its lower boundary is within a depth of 18 inches. The content of redoximorphic features in shades of brown, gray, or yellow ranges from few to many. In some pedons, the horizon has few red redoximorphic concentrations. Texture is loam, silt loam, clay loam, or silty clay loam.

The Bg horizon has hue of 10YR or 2.5Y. It has value of 5 and chroma of 1 or 2 or value of 6 and chroma of 1 to 3. A layer with matrix value of 5 and chroma of 2 or value of 6 and chroma of 3 occurs within a depth of 30 inches. The content of redoximorphic features in shades of brown, gray, or yellow ranges from few to many. A few red redoximorphic concentrations occur in some pedons. Texture is loam, silt loam, clay loam, or silty clay loam. Some pedons have stratified layers with these textures. Electrical conductivity ranges from 0 to 2.0 dS/m.

The 2Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The content of redoximorphic concentrations in shades of brown, red, or yellow ranges from none to common. In some pedons, the horizon has redoximorphic depletions in shades of gray or blue. Texture is clay loam, silty clay, or clay. The clay content ranges from 35 to about 50 percent. Electrical conductivity ranges from 0 to 4.0 dS/m.

Eastwood Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Interfluvium on coastal plain

Parent material: Clayey marine deposits

Geology: Wilcox Formation

Drainage class: Well drained

Permeability class: Very slow

Depth class: Deep to a layer of densic material

Shrink-swell potential: High

Slope range: 1 to 5 percent

Associated Soils

- An unnamed soil that is 20 to 40 inches deep over mudstone
- Guyton and Mollville soils, which are wetter than the Eastwood soils and gray throughout
- Lilbert soils, which have thick sandy surface layers
- Maben soils, which are 20 to 40 inches deep
- Metcalf soils, which are somewhat poorly drained
- Meth soils, which are developed to a depth of more than 60 inches
- Sawtown and Latex soils, which have loamy subsoils

Taxonomic Classification

Fine, smectitic, thermic Chromic Vertic Hapludalfs

Typical Pedon

Eastwood very fine sandy loam, 1 to 5 percent slopes; from the intersection of Texas Highway 87 and Farm Road 417 in Shelbyville, 6.2 miles south on Texas Highway 87 to the junction with Farm Road 139, about 6.6 miles east on Farm Road 139 to the junction with Farm Road 3184, about 0.2 mile east on Farm Road 3184 to U.S. Forest Service Dreka Work Station, 0.2 mile north of Farm Road 3184 along a powerline, 150 feet east of the powerline in compartment #29 of the Sabine National Forest, in intermixed conifers and hardwoods; Patroon North, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 42 minutes 33.10 seconds N. and long. 93 degrees 54 minutes 32.10 seconds W.

- A—0 to 7 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine to coarse roots throughout; very strongly acid; gradual wavy boundary.
- E—7 to 10 inches; brown (10YR 5/3) very fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine to coarse roots throughout; many fine to coarse pores; strongly acid; clear wavy boundary.
- Bt—10 to 19 inches; dark red (2.5YR 3/6) clay; 10 percent fine distinct pale brown (10YR 6/3) mottles; weak medium prismatic structure parting to moderate medium angular blocky; very firm, very hard; common fine and medium roots; 20 percent pressure faces and 30 percent clay films on all faces of peds; very strongly acid; gradual wavy boundary.
- Btss1—19 to 30 inches; dark red (2.5YR 3/6) clay; 10 percent medium prominent light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm, very hard; common fine roots; 7 percent slickensides (pedogenic) and 30 percent grayish brown (10YR 5/2) clay films on all faces of peds; very strongly acid; gradual wavy boundary.
- Btss2—30 to 40 inches; light brownish gray (10YR 6/2) clay; 25 percent medium prominent dark red (2.5YR 3/6) mottles; moderate medium angular blocky structure parting to moderate medium prismatic; very firm, very hard; common fine to coarse roots; 7 percent slickensides (pedogenic) and 30 percent grayish brown (10YR 5/2) clay films on all faces of peds; very strongly acid; gradual wavy boundary.
- Btss3—40 to 55 inches; light brownish gray (10YR 6/2) clay; 10 percent medium distinct light brown (7.5YR 6/4) and 10 percent fine prominent dark red (2.5YR 3/6) mottles; moderate medium prismatic structure parting to weak medium angular blocky; firm, hard; common fine to coarse roots; 5 percent slickensides (pedogenic) and 15 percent grayish brown (10YR 5/2) clay films on all faces of peds; very strongly acid; clear smooth boundary.
- Cd1—55 to 67 inches; light gray (10YR 7/1) and strong brown (7.5YR 5/6) sandy clay loam; platy structure; firm, hard; 1 percent red (2.5YR 4/6) clay films on rock fragments; extremely acid; clear smooth boundary.
- Cd2—67 to 80 inches; grayish brown (10YR 5/2), yellowish red (5YR 5/8), and brownish yellow (10YR 6/6) clay loam; platy structure; firm, hard; 1 percent barite crystals; extremely acid.

Range in Characteristics

The thickness of the solum ranges from 40 to 60 inches. Typically, the lower part of the solum has about a 20 to 30 percent decrease in clay content or a C horizon is encountered within 60 inches of the surface. Some pedons contain few fragments, mainly less than 6 inches across, of petrified wood, fossilized shells, or ironstone

pebbles. The clay content in the upper part of the Bt horizon is more than twice the clay content in the lower part of the epipedon. The clay content of the particle-size control section ranges from 35 to 65 percent, but the weighted average is 40 to 60 percent. The COLE ranges from 0.09 to 0.14 in the upper 20 inches of the Bt horizon. The LEP ranges from 2.5 to about 4 inches in the upper 50 inches. The soil cracks when dry, typically between June and September. The cracks are 1/2 inch or more wide at a depth of 20 inches and are at least 12 inches long. Few or common grayish mottles are within the upper 10 inches of the argillic horizon, but these mottles are considered relict and not related to contemporary wetness. Aluminum saturation in the upper 20 inches of the argillic horizon has a weighted average of 45 to 65 percent. Base saturation is 35 to 60 percent at a depth of 50 inches below the top of the argillic horizon or at the base of a BCt horizon, whichever is shallower.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4.

Texture typically is fine sandy loam or very fine sandy loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas.

The E or EB horizon has hue of 10YR and 7.5YR, value of 5 or 6, and chroma of 3 to 6. Texture is fine sandy loam, very fine sandy loam, silt loam, or loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas. Combined thickness of the A and E horizons ranges from 3 to 10 inches.

The upper Bt and Btss horizons have colors with hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 to 8. The content of relict mottles mainly in shades of brown or gray ranges from none to common in the Bt1 horizon and from few to many in the Bt2 horizon. Texture is clay or silty clay, and the clay content ranges from 40 to 65 percent. Pressure faces and small slickensides range from none to common in the Bt2 horizon. Reaction ranges from extremely acid to strongly acid. The lower Bt and Btss horizons have matrix colors in shades of red, brown, or gray. The content of relict mottles of these colors and mottles in shades of yellow ranges from few to many, and some horizons have a mottled matrix. Texture is clay, silty clay, silty clay loam, or clay loam. The clay content ranges from 35 to 60 percent. The content of pressure faces and small slickensides are few or common, and slickensides are less than 4 inches across. Reaction ranges from extremely acid to moderately acid.

The BCt horizon, if it occurs, is directly above the C horizon. It has matrix colors in shades of brown or gray, has lithochromic mottles of these colors, and may or may not have reddish or yellowish mottles. Some pedons have a mottled matrix of these colors. Texture is loam, sandy clay loam, clay loam, or silty clay loam. Most pedons contain few or common white masses of barite. Reaction ranges from extremely acid to slightly acid.

The C or Cd horizon has dominant colors in shades of brown or gray. It has mottles and/or strata in these colors and, in some areas, yellowish colors. The material is weakly consolidated and slakes in water. Texture ranges from fine sandy loam to silty clay loam. Most pedons contain few masses of white barite salts. Reaction is extremely variable and ranges from extremely acid to neutral.

Gallime Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Stream terrace on coastal plain

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Well drained

Permeability class: Moderate

Depth class: Very deep

Soil Survey of Shelby County, Texas

Shrink-swell potential: Moderate

Slope range: 0 to 3 percent

Associated Soils

- Bernaldo soils, which do not have thick surface layers
- Besner soils, which are coarser textured than the Gallime soils
- Guyton and Mollville soils, which are wetter than the Gallime soils and gray throughout
- Laneville and Dreka soils, which are on flood plains
- Metcalf soils, which are somewhat poorly drained

Taxonomic Classification

Fine-loamy, siliceous, semiactive, thermic Glossic Paleudalfs

Typical Pedon

Gallime very fine sandy loam, 0 to 3 percent slopes; from the intersection of Farm Roads 3172 and 2694 in Huxley, approximately 1.25 miles south on Farm Road 3172 to the intersection with U.S. Forest Service Road 100, about 1.75 miles east on U.S. Forest Service Roads 100 and 100A towards Haley's Ferry, 120 feet south on a logging road, 25 feet west of the logging road in compartment #24 of the Sabine National Forest, in intermixed conifers and hardwoods; Brushy Creek, Louisiana USGS 7.5 Minute Quadrangle; lat. 31 degrees 44 minutes 8.00 seconds N. and long. 93 degrees 50 minutes 13.00 seconds W.

A—0 to 3 inches; brown (10YR 4/3) very fine sandy loam; weak medium subangular blocky structure; friable, soft; common fine and medium and few coarse roots; very strongly acid; clear smooth boundary.

E1—3 to 12 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable, soft; common fine and medium roots; 1 percent 0.1- to 3.0-inch ironstone nodules; very strongly acid; gradual smooth boundary.

E2—12 to 20 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable, soft; common fine and medium roots; strongly acid; diffuse wavy boundary.

Bt1—20 to 24 inches; light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable, soft; 10 percent clay films on all faces of peds; 4 percent light yellowish brown (10YR 6/4) clay depletions between peds; 1 percent 0.1- to 3.0-inch ironstone nodules; strongly acid; clear wavy boundary.

Bt2—24 to 43 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm, slightly hard; common fine and medium and few coarse roots; 10 percent continuous clay films on all faces of peds; 1 percent fine distinct brownish yellow (10YR 6/6) iron depletions; 1 percent 0.1- to 0.5-inch ironstone nodules; strongly acid; gradual wavy boundary.

Bt/E—43 to 80 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable, slightly hard; few fine and medium pores; 10 percent discontinuous clay films on all faces of peds; 10 percent coarse distinct yellowish red (5YR 5/6) masses of oxidized iron; 13 percent very pale brown (10YR 7/3) clay depletions between peds; 2 percent 0.1- to 0.5-inch ironstone nodules; strongly acid.

Range in Characteristics

The solum is more than 80 inches thick. Base saturation ranges from 35 to 60 percent in the lower part of the argillic horizon. The weighted average clay content of

the control section ranges from 18 to 25 percent. The combined thickness of the A and E horizons is 20 to 40 inches.

The A horizon has colors in shades of brown with hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. Horizons with mollic colors are less than 7 inches thick. Texture typically is very fine sandy loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The E horizon has colors with values 1 to 3 units greater than those of the A horizon. It has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 4. Texture is fine sandy loam, very fine sandy loam, or loam. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The Bt horizon, if it occurs, has hue of 5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The content of redoximorphic features in shades of red, brown, or gray is few or common in most pedons. However, the upper part of the Bt horizon of some pedons does not contain redoximorphic concentrations. Depth to redoximorphic depletions typically ranges from 30 to about 65 inches. Texture is loam or sandy clay loam. Reaction ranges from very strongly acid to moderately acid.

The Bt/E horizon has colors in shades of brown, red, yellow, and gray. The E part of the horizon, or the albic material, occurs as streaks, pockets, and coatings on the surface of peds and makes up 5 to 15 percent, by volume, of the horizon. Texture of the matrix is loam, sandy clay loam, or clay loam. Brittle masses make up about 5 to 20 percent of most pedons. The content of nodular fragments of plinthite is less than 4 percent, by volume, in some pedons. Reaction ranges from very strongly acid to moderately acid.

Grapeland Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Broad interstream divide on coastal plain

Parent material: Sandy marine sediments

Geology: Carrizo Formation

Drainage class: Somewhat excessively drained

Permeability class: Rapid

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 1 to 5 percent

Associated Soils

- Betis soils, which have a subsoil that is browner than that of the Grapeland soils
- Darco soils, which have a continuous subsoil below a depth of 40 inches
- Iulus and Owentown soils, which are on flood plains
- Kirvin and Cuthbert soils, which have red clayey subsoils
- Lilbert, Rentzel, and Tenaha soils, which have loamy subsoils

Taxonomic Classification

Siliceous, thermic Psammentic Paleudults

Typical Pedon

Grapeland loamy fine sand, 1 to 5 percent slopes; from the intersection of Farm Road 711 and Texas Highway 7 southwest of Center, approximately 5.6 miles south on Farm Road 711 to the intersection with County Road 1286, about 100 feet west on County Road 1286, about 20 feet south between the road and a fenceline, in tame pastureland; Mount Herman, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 39 minutes 51.20 seconds N. and long. 94 degrees 15 minutes 17.70 seconds W.

- Ap—0 to 6 inches; brown (10YR 4/3) loamy fine sand; single grain; loose; many fine and medium roots; strongly acid; clear smooth boundary.
- Bt1—6 to 30 inches; yellowish red (5YR 4/6) loamy fine sand; weak fine subangular blocky structure; very friable, soft; many fine and medium roots; 2 percent clay bridging between sand grains; very strongly acid; gradual smooth boundary.
- Bt2—30 to 68 inches; yellowish red (5YR 5/6) loamy fine sand; weak fine subangular blocky structure; very friable, soft; many medium roots; 2 percent clay bridging between sand grains; very strongly acid; gradual smooth boundary.
- Bt3—68 to 80 inches; yellowish red (5YR 5/8) loamy fine sand; weak fine subangular blocky structure; very friable, soft; common medium roots; 2 percent clay bridging between sand grains; 5 percent (10YR 7/3) clean sand spots; very strongly acid.

Range in Characteristics

The solum is more than 80 inches thick. Reaction ranges from extremely acid to strongly acid, except in limed areas. The soil is dry in some part of the moisture-control section for 75 to 90 days in most years. The content of rounded ironstone nodules that are mainly less than $\frac{1}{2}$ inch across is none or few throughout the profile.

The A or Ap horizon has hue 7.5YR or 10YR, value of 3 to 5, and chroma of 3 or 4. Texture typically is loamy fine sand. Some pedons have an E horizon with color values 1 or 2 units higher than those of the A horizon.

The EB horizon, if it occurs, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. Texture is fine sand or loamy fine sand.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 6 to 8. Texture is loamy sand or loamy fine sand, and the horizon contains at least 3 percent more clay than the horizon above. The content of streaks and spots of uncoated sand ranges from 0 to about 5 percent.

The Bt horizon and the E horizon, if it occurs, have hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. Texture is fine sand, loamy sand, or loamy fine sand. The content of streaks and spots of uncoated sand are few or common.

Guyton Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Closed depression on stream terrace

Parent material: Loamy alluvium

Geology: Fluvial terrace

Drainage class: Very poorly drained

Permeability class: Slow

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 1 percent

Associated Soils

- Bernaldo soils, which are fine-loamy and better drained than the Guyton soils
- Besner soils, which are coarse-loamy and better drained than the Guyton soils
- Cart and Timpson soils, which are drier than the Guyton soils and have coarser subsoils
- Eastwood soils, which have red clayey subsoils
- Metcalf soils, which do not have the dominance of gray throughout
- Mollville soils, which have fine-loamy subsoils
- Sawtown and Gallime soils, which are drier than the Guyton soils and have fine-loamy subsoils

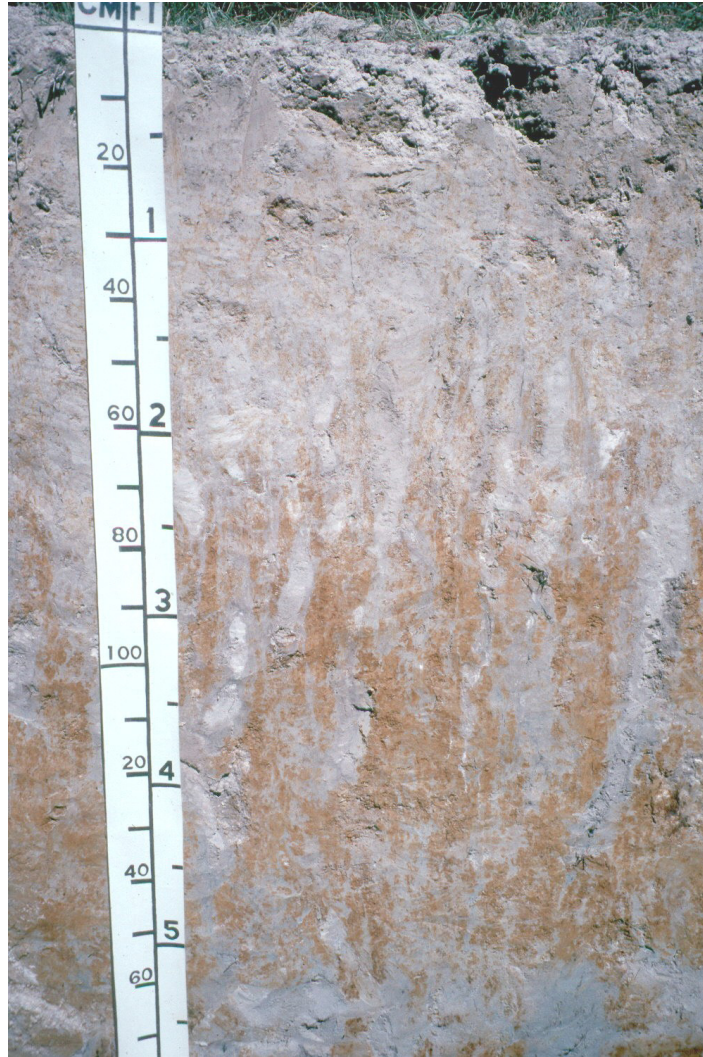


Figure 12.—A profile of Guyton silt loam.

Taxonomic Classification

Fine-silty, siliceous, active, thermic Typic Glossaqualfs

Typical Pedon

Guyton silt loam, ponded (fig. 12); from the intersection of Texas Highway 84 and Farm Road 3174 in Haslam, 0.2 mile northwest on Farm Road 3174, about 150 west on a high line right-of-way, 50 feet south in hardwoods; Logansport West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 58 minutes 7.80 seconds N. and long. 94 degrees 2 minutes 55.00 seconds W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; friable, slightly hard; common fine and medium roots; common fine and medium pores; 1 percent fine distinct dark yellowish brown (10YR 3/6) masses of oxidized iron; very strongly acid; clear wavy boundary.

Eg1—2 to 9 inches; light brownish gray (10YR 6/2) silt loam; weak fine subangular blocky structure; friable, slightly hard; common fine and medium roots; common

- fine and medium pores; 1 percent fine and medium distinct dark yellowish brown (10YR 3/6) masses of oxidized iron; very strongly acid; gradual wavy boundary.
- Eg2—9 to 15 inches; light brownish gray (10YR 6/2) silt loam; weak fine subangular blocky structure; friable, slightly hard; common fine and medium roots; common fine and medium pores; 5 percent medium distinct dark yellowish brown (10YR 3/6) masses of oxidized iron; strongly acid; gradual wavy boundary.
- Btg/E1—15 to 29 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium subangular blocky structure; firm, hard; common fine roots; common fine and medium pores; 25 percent, by volume, tongues of albic material; 10 percent, by volume, krotovinas; 8 percent clay films on all faces of peds; 5 percent medium and coarse prominent olive yellow (2.5Y 6/6) masses of oxidized iron; 25 percent light brownish gray (10YR 6/2) clay depletions; dark grayish brown (10YR 4/2) krotovinas; extremely acid; gradual wavy boundary.
- Btg/E2—29 to 43 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium subangular blocky structure; very firm, very hard; common fine pores; 25 percent, by volume, tongues of albic material; 8 percent clay films on all faces of peds; 8 percent medium prominent olive yellow (2.5Y 6/6) masses of oxidized iron; 25 percent light yellowish brown (10YR 6/4) clay depletions; very strongly acid; gradual wavy boundary.
- Btg/E3—43 to 59 inches; grayish brown (2.5Y 5/2) clay loam; moderate medium subangular blocky structure; very firm, extremely hard; common fine pores; 2 percent pressure faces and 8 percent clay films on all faces of peds; 1 percent fine distinct light olive brown (2.5Y 5/6) masses of oxidized iron; 10 percent light yellowish brown (10YR 6/4) clay depletions; 1 percent medium barite crystals; very strongly acid; gradual wavy boundary.
- Btg—59 to 80 inches; light brownish gray (2.5Y 6/2) clay loam; moderate medium subangular blocky structure; very firm, extremely hard; 2 percent pressure faces, 2 percent slickensides (pedogenic), and 12 percent clay films on all faces of peds; 1 percent fine prominent strong brown (7.5YR 5/6) masses of oxidized iron; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 50 to about 80 inches. The sand content, which is dominantly very fine sand, ranges from 10 to 40 percent in the control section. Exchangeable sodium ranges from less than 5 percent to 40 percent in the lower part of the solum.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 or 3. Where value is 3, the horizon is less than 6 inches thick. Texture typically is silt loam. Reaction ranges from extremely acid to moderately acid.

The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. The content of mottles in shades of brown ranges from few to many. Texture is silt loam, loam, or very fine sandy loam. Reaction ranges from extremely acid to moderately acid. The lower boundary of the Eg horizon is clear irregular or abrupt irregular, and tongues of this horizon extend into the Btg horizon.

Some pedons have an E/B horizon that is 6 to 18 inches thick. Most pedons have a thick B/E horizon. The Bt and E parts of the E/B and B/E horizons have the same range in color. In some pedons, a horizon with chroma of 4 and the same textures and reaction as the Btg and Eg horizons occurs.

The Btg or Btg/E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The content of mottles in shades of red, brown, or gray ranges from few to many. Texture is silt loam, loam, silty clay loam, clay loam, silty clay, or clay. Reaction ranges from very strongly acid to slightly alkaline.

The BC and Cg horizons, if they occur, have the same color range as the Btg horizon. Texture is silt loam, loam, silty clay loam, clay loam, sandy clay loam, silty

clay, or clay. Reaction of the BC horizon ranges from extremely acid to moderately acid. Reaction of the Cg horizon ranges from strongly acid to moderately alkaline.

Hainesville Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Stream terrace on coastal plain

Parent material: Sandy alluvium

Geology: Fluvial terrace

Drainage class: Somewhat excessively drained

Permeability class: Moderately rapid

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 2 percent

Associated Soils

- Bernaldo, Gallime, and Sawtown soils, which are fine-loamy
- Besner soils, which have coarse-loamy subsoils
- Dreka, Laneville, and Iulus soils, which are on flood plains
- Mollville and Guyton soils, which are wetter than the Hainesville soils and gray throughout
- Timpson soils, which are coarse-silty

Taxonomic Classification

Thermic, coated Lamellic Quartzipsamments

Typical Pedon

Hainesville fine sand, 0 to 5 percent slopes; from the intersection of Farm Road 139 and Farm Road 2572 southeast of Joaquin, approximately 1.6 miles east on Farm Road 2572 to the end of state maintenance at the Sabine River Authority parking area, approximately 0.56 mile southeast on the main access road through the North Toledo Bend Wildlife Management Area to a fork in the road, approximately 250 feet north of the fork in an abandoned field in other grass/herbaceous cover; Logansport East, Louisiana USGS 7.5 Minute Quadrangle; lat. 31 degrees 54 minutes 50.70 seconds N. and long. 93 degrees 57 minutes 35.40 seconds W.

Ap—0 to 7 inches; brown (10YR 4/3) fine sand; single grain; loose; common fine and medium roots; very strongly acid; clear smooth boundary.

E1—7 to 23 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; common fine and medium roots; 5 percent fine faint dark yellowish brown (10YR 4/4) and 5 percent medium faint dark yellowish brown (10YR 4/4) masses of oxidized iron with diffuse boundaries; very strongly acid; gradual smooth boundary.

E2—23 to 45 inches; light yellowish brown (10YR 6/4) fine sand; loose; 20 percent clay bridging between sand grains; few yellowish brown (10YR 5/6) lamellae; very strongly acid; gradual smooth boundary.

Bw1—45 to 65 inches; brownish yellow (10YR 6/6) fine sand; weak coarse subangular blocky structure; loose; common medium roots; 10 percent medium distinct light gray (10YR 7/2) iron depletions with diffuse boundaries; 3 percent, by volume, yellowish brown (10YR 5/6) lamellae of fine sandy loam with clay bridging between sand grains; very strongly acid; clear smooth boundary.

Bw2—65 to 80 inches; brownish yellow (10YR 6/6) fine sand; single grain; loose; common medium roots; 10 percent medium distinct very pale brown (10YR 7/3)

iron depletions with diffuse boundaries; 2 percent, by volume, brownish yellow (10YR 6/8) lamellae; very strongly acid.

Range in Characteristics

The solum is more than 80 inches thick. Lamellae are within a depth of 40 to 72 inches. The lamellae range from 0.1 to 2.5 cm in thickness, and the cumulative thickness is less than 6 inches (15 cm). They are in shades of brown or red and have textures of loamy fine sand or fine sandy loam. The soil is dry in the moisture-control section 60 to 90 cumulative days in most years. The content of rounded siliceous or ironstone pebbles ranges from very few to about 3 percent in most pedons.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 3 or 4. Texture typically is fine sand. Reaction ranges from very strongly acid to slightly acid.

The E horizon, if it occurs, and the E part of the B/E or E/B horizon have hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 or 4. Texture is fine sand or loamy fine sand. Reaction ranges from very strongly acid to slightly acid.

The Bw and B&E horizons and the B part of the B/E or E/B horizon have hue of 5YR to 10YR, value of 5 to 7, and chroma of 6 to 8. Texture is fine sand or loamy fine sand. Reaction ranges from very strongly acid to slightly acid.

Iulus Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Flood plain on coastal plain

Parent material: Stratified loamy and sandy alluvium

Geology: Alluvium

Drainage class: Moderately well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 1 percent

Associated Soils

- Dreka soils, which are grayer and wetter than the Iulus soils
- Laneville soils, which are fine-silty and in similar positions
- Owentown soils, which are drier than the Iulus soils and in similar positions

Taxonomic Classification

Coarse-loamy, siliceous, active, thermic Fluvaquentic Dystrudepts

Typical Pedon

Iulus fine sandy loam in an area of Iulus soils, frequently flooded; from the intersection of Farm Road 417 and Farm Road 2694 east of Shelbyville, approximately 4.9 miles east on Farm Road 2694 to the intersection with Farm Road 3471, approximately 0.63 mile west on County Road 2603; site is 70 feet north on a flood plain, in hardwoods; Patroon North, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 45 minutes 0.00 seconds N. and long. 93 degrees 59 minutes 0.10 seconds W.

A—0 to 4 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine and few medium and coarse roots; very strongly acid; gradual smooth boundary.

Bw1—4 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable, soft; few fine and medium roots; few medium

pores; 1 percent fine distinct strong brown (7.5YR 5/6) masses of oxidized iron on surfaces along pores; 1 percent fine distinct light brownish gray (10YR 6/2) iron depletions throughout; very strongly acid; gradual smooth boundary.

Bw2—18 to 24 inches; brown (10YR 5/3) loamy fine sand; weak fine subangular blocky structure; friable, soft; few fine and medium pores; 1 percent fine distinct strong brown (7.5YR 5/6) masses of oxidized iron on surfaces along pores; 10 percent medium faint light brownish gray (10YR 6/2) iron depletions throughout; very strongly acid; gradual smooth boundary.

Bg1—24 to 35 inches; light brownish gray (10YR 6/2) fine sandy loam; weak medium subangular blocky structure; friable, soft; few fine and medium pores; 1 percent medium faint dark yellowish brown (10YR 4/4) and 10 percent coarse faint brown (10YR 5/3) masses of oxidized iron throughout; very strongly acid; gradual smooth boundary.

Bg2—35 to 44 inches; light brownish gray (10YR 6/2) fine sandy loam; weak medium subangular blocky structure; friable, soft; few medium pores; 10 percent medium and coarse faint brown (10YR 5/3) masses of oxidized iron throughout; very strongly acid; gradual smooth boundary.

Bg3—44 to 80 inches; yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) fine sandy loam; weak medium subangular blocky structure; friable, soft; 1 percent fine distinct masses of oxidized iron throughout; 1 percent black (10YR 2/1) manganese coatings; strongly acid.

Range in Characteristics

The solum is more than 80 inches thick. Thickness of the loamy alluvial sediments ranges from 7 to 14 feet. The weighted average clay content of the control section ranges from 10 to 18 percent. The soil is dry in some part in the moisture-control section for more than 60 cumulative days in most years. Some pedons have a buried A horizon in or below the control section. Reaction ranges from extremely acid to moderately acid throughout the profile.

The A horizon has colors in shades of brown with hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. In some pedons it has few fine redoximorphic features in shades of brown or gray. Texture is typically fine sandy loam; however, a thin overwash layer that is fine sand or loamy fine sand occurs in some pedons.

The Bw horizon has matrix colors in shades of brown with hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. The content of redoximorphic features in shades of gray, brown, yellow, or red ranges from few to many. Redoximorphic depletions are within a depth of 24 inches of the soil surface. Texture is fine sandy loam or loam in the upper part of the horizon but ranges to sandy clay loam in the lower part of some pedons, or the horizon is stratified with these textures. Some pedons have thin subhorizons that are silt loam, very fine sandy loam, or loamy fine sand.

The Bg horizon has matrix colors in shades of brown or gray with chroma of 2 or less. The content of redoximorphic features in shades of brown, yellow, red, or gray ranges from few to many. Some pedons have mixed redoximorphic features of these colors. Texture is fine sandy loam, very fine sandy loam, loam, silt loam, or sandy clay loam. Most pedons have more than one texture, and some pedons have thin strata of loamy fine sand. Horizons with more than 18 percent clay are common in the lower part of the pedon or below the particle-size control section.

Kirvin Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Ridge on coastal plain

Parent material: Interbedded sandstone and shale

Soil Survey of Shelby County, Texas

Geology: Carrizo and Reklaw Formations

Drainage class: Well drained

Permeability class: Moderately slow

Depth class: Deep to a layer of densic material

Shrink-swell potential: Moderate

Slope range: 1 to 5 percent

Associated Soils

- Bowie soils, which have loamy subsoils and are deeper than the Kirvin soils
- Cuthbert soils, which are 20 to 40 inches deep
- Dreka and Laneville soils, which are on flood plains
- Lilbert and Tenaha soils, which have thick sandy surface layers
- Rentzel soils, which are somewhat poorly drained
- Sacul soils, which are moderately well drained

Taxonomic Classification

Fine, mixed, semiactive, thermic Typic Hapludults

Typical Pedon

Kirvin fine sandy loam, 1 to 5 percent slopes; from Mount Herman southwest of Center at the intersection of Texas Highway 7 and County Road 1184, about 3.5 miles south on County Road 1184, about 0.2 mile east on a timber company road; site is 100 feet north of the road on a ridge in a clear-cut area, in intermixed conifers and hardwoods; Mount Herman, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 39 minutes 13.65 seconds N. and long. 94 degrees 17 minutes 19.63 seconds W.

Ap—0 to 6 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common fine and medium roots throughout; 10 percent ironstone nodules; very strongly acid; clear smooth boundary.

E—6 to 12 inches; light brown (7.5YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common fine and medium roots throughout; 8 percent ironstone nodules; very strongly acid; clear wavy boundary.

Bt1—12 to 18 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; very firm, extremely hard; common fine and medium roots between peds; 10 percent clay films on all faces of peds and 20 percent pressure faces; very strongly acid; clear wavy boundary.

Bt2—18 to 28 inches; red (2.5YR 4/6) clay; 1 percent fine and medium distinct dark red (2.5YR 3/6) and 10 percent fine and medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; very firm, extremely hard; 5 percent clay films on all faces of peds and 10 percent pressure faces; very strongly acid; clear wavy boundary.

Bt3—28 to 41 inches; red (2.5YR 4/6) clay; 10 percent medium and coarse prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; very firm, extremely hard; 10 percent pressure faces and 10 percent clay films on all faces of peds; 12 percent subangular clayey shale fragments; very strongly acid; clear wavy boundary.

BC—41 to 43 inches; red (2.5YR 5/8) fine sandy loam; 10 percent medium and coarse prominent brownish yellow (10YR 6/6) mottles; massive parting to platy structure; firm, hard; very strongly acid; clear wavy boundary.

Cd1—43 to 48 inches; dusky red (10R 3/3) and strong brown (7.5YR 5/8) weathered bedrock; 2 percent coarse prominent brownish yellow (10YR 6/6) and 2 percent medium prominent light brownish gray (10YR 6/2) mottles; massive parting to platy structure; very firm, hard; extremely acid; clear smooth boundary.

Cd2—48 to 57 inches; light brownish gray (10YR 6/2) and dusky red (10R 3/3)

weathered bedrock; massive parting to platy structure; very firm, hard; extremely acid; clear smooth boundary.

Cd3—57 to 80 inches; red (2.5YR 4/6) and dark red (10R 3/6) weathered bedrock; 1 percent medium prominent brownish yellow (10YR 6/8) and 1 percent medium prominent light brownish gray (10YR 6/2) mottles; massive parting to platy structure; very firm, hard; extremely acid.

Range in Characteristics

The thickness of the solum ranges from 40 to 60 inches. The particle-size control section has 40 to 60 percent clay. The content of ironstone and sandstone fragments that are less than 1 inch to 3 inches across the longest axis ranges from about 1 to 50 percent in the A horizon and from 0 to 15 percent, by volume, in the B and C horizons. Coarse fragments that are 3 to 24 inches across are on or imbedded in the surface layer in some pedons. They cover less than 1 percent of the surface area.

The A horizon has hue mainly of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. In some pedons, the horizon has hue of 5YR, value of 4 or 5, and chroma of 5 or 6. The E horizon has value that is 1 or 2 units greater than that of the A horizon. Texture typically is fine sandy loam or their gravelly counterparts. A graded phase which also includes sandy clay loam and clay loam surface textures is recognized. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8.

The content of yellowish or brownish redoximorphic concentrations ranges from none to common. Grayish platy shale fragments or relict redoximorphic depletions are in the lower part of some pedons. Texture is clay, sandy clay, or clay loam. Reaction ranges from extremely acid to strongly acid.

The BC horizon has reddish, yellowish, or brownish colors and is commonly mottled with these or grayish colors. The content of thin strata and fragments of sandstone or shaly materials ranges from none to common. Texture is sandy clay loam, clay loam, or clay. Reaction is extremely acid or very strongly acid.

The C or Cd horizon is stratified layers of sandstone and shale. The sandstone has texture of fine sandy loam or sandy clay loam. The shale has a clay loam or clay texture. The loamy sandstone materials have colors in shades of red, yellow, or brown, and the shaly materials are mainly in shades of gray. The amount of sandstone or shaly materials is variable, and both may be absent in some pedons. Roots penetrate the materials but are concentrated along fractures or cleavage planes. A few mica flakes are in most pedons typically between plates of shale. Most pedons have clay flows along vertical fractures. Many pedons have discontinuous, fractured, strongly cemented or indurated sandstone layers about 1 to 4 inches thick. They appear to have the slope of an ancient surface gradient and are also within the argillic horizon of some pedons. Reaction ranges from extremely acid to strongly acid.

Laneville Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Flood plain on coastal plain

Parent material: Loamy and clayey alluvium

Geology: Alluvium

Drainage class: Moderately well drained

Permeability class: Slow

Depth class: Very deep

Shrink-swell potential: High

Slope range: 0 to 1 percent

Associated Soils

- An unnamed soil that is wetter than the Laneville soils and has a mucky surface layer
- Cuthbert and Maben soils, which have red clayey subsoils
- Dreka soils, which are wetter and grayer than the Laneville soils
- Iulus and Owentown soils, which are coarse-loamy
- Rentzel and Hainesville soils, which have sandy surface layers

Taxonomic Classification

Fine-silty, siliceous, active, thermic Fluvaquentic Eutrudepts

Typical Pedon

Laneville loam, 0 to 1 percent slopes, frequently flooded; from the intersection of Texas Highway 7 and Loop 500 on the southwest side of Center, 0.1 mile southwest on Texas Highway 7, about 500 feet southeast through a gate in pastureland on a flood plain of Huana Creek, in tame pastureland; Center, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 45 minutes 56.95 seconds N. and long. 94 degrees 12 minutes 7.39 seconds W.

- Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure; friable, soft; common fine and few medium roots; few fine pores; 1 percent dark brown (10YR 3/3) manganese coatings; 1 percent strong brown (7.5YR 5/6) manganese coatings; 1 percent very dark gray (10YR 3/1) iron-manganese nodules; very strongly acid; clear smooth boundary.
- Bw1—7 to 10 inches; yellowish brown (10YR 5/6), grayish brown (10YR 5/2), and dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable, hard; few fine and medium roots; very strongly acid; clear smooth boundary.
- Bw2—10 to 24 inches; yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/4), and grayish brown (10YR 5/2) silt loam; moderate medium subangular blocky structure; friable, hard; few fine roots; few fine pores; 10 percent fine and medium faint dark yellowish brown (10YR 4/6) masses of oxidized iron; very strongly acid; gradual smooth boundary.
- Bg1—24 to 35 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm, hard; few fine roots; few fine and medium pores; 1 percent brown (10YR 4/3) and dark brown (10YR 3/3) manganese coatings; 3 percent very dark gray (10YR 3/1) iron-manganese nodules; 10 percent fine and medium faint yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid; gradual wavy boundary.
- 2Bg2—35 to 45 inches; grayish brown (10YR 5/2) clay; moderate medium subangular blocky structure; very firm, very hard; few fine roots; 1 percent medium distinct dark yellowish brown (10YR 4/6) masses of oxidized iron; 2 percent brown (10YR 4/3) manganese coatings; 3 percent very dark gray (10YR 3/1) iron-manganese nodules; very strongly acid; gradual wavy boundary.
- 2Bg3—45 to 80 inches; grayish brown (10YR 5/2) clay; moderate medium subangular blocky structure; extremely firm, extremely hard; few fine roots; 1 percent fine and medium very dark gray (10YR 3/1) iron-manganese nodules; 10 percent fine and medium distinct strong brown (7.5YR 5/6) masses of oxidized iron; very strongly acid.

Range in Characteristics

The solum is more than 80 inches thick. The weighted average clay content of the control section ranges from 25 to 35 percent. Base saturation is 60 percent or more in a subhorizon between depths of 10 and 30 inches. By weight, less than 15 percent of the particles are fine sand or coarser. Rounded ironstone pebbles range from 0 to 5 percent. Iron-manganese concretions and masses typically range from few to 5

percent. Depth to a horizon containing more than 35 percent clay ranges from 30 to 50 inches. Some pedons have a buried A horizon at a depth of 30 to 60 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The content of redoximorphic concentrations in shades of brown, red, and yellow ranges from none to common. Texture typically is loam or silt loam. Reaction ranges from very strongly acid to slightly acid.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8, or it is variegated with these colors. The content of redoximorphic depletions with chroma of 2 or less ranges from few to many. Reddish redoximorphic concentrations occur in some pedons. Texture is loam, clay loam, silt loam, or silty clay loam. Reaction ranges from extremely acid to strongly acid.

The Bg horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Redoximorphic concentrations are in shades of red, yellow, or brown. Texture is loam, clay loam, silt loam, or silty clay loam. Reaction ranges from extremely acid to moderately acid.

The 2Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The content of redoximorphic concentrations in shades of red, yellow, or brown is common or many. Texture is clay loam, silty clay, or clay, and the clay content is 35 to 50 percent. Reaction ranges from extremely acid to moderately acid. It is slightly acid or neutral below a depth of 60 inches in some pedons.

A 2BC horizon occurs below a depth of 60 inches in some pedons. It has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The content of redoximorphic concentrations in shades of red, yellow, or brown is common or many. Texture is clay loam, silty clay, or clay, and the clay content is 35 to 50 percent. Reaction ranges from extremely acid to neutral.

Latex Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Marine terrace on coastal plain

Parent material: Loamy over clayey sediments

Geology: Wilcox Formation

Drainage class: Moderately well drained

Permeability class: Slow

Depth class: Very deep

Shrink-swell potential: High

Slope range: 1 to 3 percent

Associated Soils

- Bernaldo soils, which are not clayey in the lower part of the subsoil
- Dreka and Laneville soils, which are on flood plains
- Eastwood and Meth soils, which have red clayey subsoils
- Guyton soils, which are wetter than the Latex soils and gray throughout
- Metcalf soils, which are somewhat poorly drained
- Sawtown soils, which have surface layers that are thicker than those of the Latex soils
- Timpson soils, which have coarse-silty subsoils

Taxonomic Classification

Fine-loamy, siliceous, semiactive, thermic Glossic Paleudalfs

Typical Pedon

Latex fine sandy loam, 1 to 3 percent slopes (fig. 13); from the intersection of Farm



Figure 13.—A profile of Latex fine sandy loam.

Roads 2694 and 3172 at Huxley, approximately 0.4 mile east on Farm Road 2694, about 0.2 mile south and southeast on an oil-topped road (Whooping Crane Road), 200 feet south of the road in compartment #21 of the Sabine National Forest, in intermixed conifers and hardwoods; Union Springs, Louisiana USGS 7.5 Minute Quadrangle; lat. 31 degrees 44 minutes 54.25 seconds N. and long. 93 degrees 51 minutes 41.86 seconds W.

- A—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak very fine subangular blocky structure; friable, soft; common fine to coarse roots; 26 percent fine sand; 3 percent medium sand; 36 percent very fine sand; moderately acid; clear smooth boundary.
- E—7 to 11 inches; brown (7.5YR 5/4) very fine sandy loam; weak fine subangular blocky structure; friable, soft; common fine to coarse roots; 25 percent fine sand; 5 percent medium sand; 33 percent very fine sand; moderately acid; gradual smooth boundary.
- Bt1—11 to 22 inches; strong brown (7.5YR 5/8) loam; weak medium subangular blocky structure; friable, soft; common fine and medium roots; 24 percent fine

- sand; 3 percent medium sand; 25 percent very fine sand; 10 percent clay films on faces of peds; strongly acid; gradual smooth boundary.
- Bt2—22 to 30 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm, slightly hard; common fine and medium roots; 19 percent fine sand; 3 percent medium sand; 28 percent very fine sand; 10 percent clay films on faces of peds; 2 percent ironstone nodules; very strongly acid; gradual smooth boundary.
- Bt3—30 to 40 inches; reddish yellow (7.5YR 6/8) loam; moderate medium subangular blocky structure; firm, slightly hard; common medium roots; 21 percent fine sand; 2 percent medium sand; 21 percent very fine sand; 10 percent clay films on faces of peds; 10 percent medium distinct yellowish red (5YR 5/8) and 10 percent medium prominent red (2.5YR 4/8) masses of oxidized iron; 10 percent medium distinct brownish yellow (10YR 6/6) iron depletions; 3 percent ironstone nodules; very strongly acid; gradual smooth boundary.
- Bt/E—40 to 55 inches; brownish yellow (10YR 6/6) loam; moderate medium subangular blocky structure; firm, slightly hard; common medium roots; 18 percent fine sand; 2 percent medium sand; 25 percent very fine sand; 10 percent clay films on faces of peds; 10 percent medium and coarse prominent red (2.5YR 4/8) masses of oxidized iron; 10 percent pale brown (10YR 6/3) clay depletions; very strongly acid; gradual smooth boundary.
- 2Bt/E—55 to 58 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; firm, hard; common medium roots; 21 percent fine sand; 1 percent medium sand; 17 percent very fine sand; 5 percent clay films on faces of peds; 8 percent medium prominent light brownish gray (10YR 6/2) and 8 percent medium prominent brownish yellow (10YR 6/6) iron depletions; 8 percent medium and coarse distinct dark red (10R 3/6) masses of oxidized iron; 10 percent light brownish gray (10YR 6/2) clay depletions; very strongly acid; clear smooth boundary.
- 2Bt—58 to 80 inches; dark red (10R 3/6) and light brownish gray (10YR 6/2) clay; moderate medium subangular blocky structure; firm, hard; common fine roots; 23 percent fine sand; 1 percent medium sand; 19 percent very fine sand; 10 percent clay films on faces of peds; 1 percent fine distinct brownish yellow (10YR 6/6) masses of oxidized iron; very strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Depth to the clayey discontinuity ranges from 36 to 60 inches. The content of petrified wood fragments less than 3 inches across is none or few near the contact of the 2Bt horizon. Base saturation at a depth 50 inches below the top of the Bt horizon ranges from 35 to 60 percent.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Texture typically is fine sandy loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4.

Texture is fine sandy loam, very fine sandy loam, or loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas. The combined thickness of the A and E horizons ranges from 6 to 18 inches.

An EB horizon occurs in some pedons. It has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. Texture is fine sandy loam or very fine sandy loam. Reaction is very strongly acid or strongly acid, except in limed areas.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8.

Typically, the content of redoximorphic concentrations in shades of red, brown, or yellow ranges from none to common. Texture is loam, clay loam, or sandy clay loam. The content of streaks and pockets of albic material ranges from 0 to 4 percent, by volume. The content of ironstone pebbles ranges from 0 to 15 percent, by volume;

however, in some pedons the horizon has pockets 6 to 10 inches in diameter that contain as much as 35 percent pebbles. Reaction is very strongly acid or strongly acid.

The Bt part of the Bt/E horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. The content of redoximorphic concentrations in shades of red, yellow, or brown and iron depletions in shades of gray is few or common. Some horizons have a variegated matrix of these colors. Texture is clay loam, loam, or sandy clay loam. The E part of the Bt/E horizon consists of streaks and pockets of albic material that range from 5 to 10 percent, by volume. The content of ironstone pebbles ranges from 0 to 15 percent, by volume, throughout the horizon. The content of brittle masses of iron accumulation in shades of red, dark red, or yellowish red is as much as 25 percent, by volume, in some pedons. Reaction is very strongly acid or strongly acid.

Where it occurs, the 2Bt horizon or the 2Bt part of the 2Bt/E horizon has hue of 10R to 10YR, value of 3 to 5, and chroma of 6 to 8. The content of redoximorphic concentrations in shades of brown or yellow and iron depletions in shades of gray ranges from few to many. Some pedons have a variegated matrix with these colors. Texture is clay loam or clay, with 35 to 45 percent clay. The E part of the 2Bt/E horizon consists of streaks and pockets of albic material that make up 5 to 15 percent of the volume. The content of ironstone pebbles ranges from 0 to 10 percent, by volume, throughout the horizon. Reaction is very strongly acid.

The 2Btg horizon has hue of 10YR, value of 6 or 7, chroma of 1 or 2. The content of redoximorphic concentrations in shades of yellow, red, or brown ranges from few to many. Some pedons are variegated with these colors. Texture is clay or silty clay. The content of streaks and pockets of albic material ranges from 0 to 4 percent, by volume. The content of slickensides, which are less than 4 inches across, is none or few. Reaction is very strongly acid.

The 2BC horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. The content of redoximorphic concentrations in shades of red, yellow, or brown is common or many. Some pedons have a variegated matrix of these colors. Texture is stratified clay loam, silty clay, clay, very fine sandy loam, or silt loam. The content of pressure faces is none or few. Reaction is extremely acid or very strongly acid.

Lilbert Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Interfluvium on coastal plain

Parent material: Sandy and loamy sediments

Geology: Carrizo Formation

Drainage class: Well drained

Permeability class: Moderately slow

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 1 to 5 percent

Associated Soils

- Betis and Grapeland soils, which are sandy throughout
- Bowie soils, which do not have a thick sandy surface layer
- Cuthbert and Kirvin soils, which have clayey subsoils
- Darco soils, which have sandy surface layers that are 40 to 80 inches thick
- Dreka, Laneville, and Iulus soils, which are on flood plains
- Rentzel soils, which are moderately well drained
- Tenaha soils, which are 40 to 60 inches deep and are in similar areas



Figure 14.—A profile of Lilbert loamy fine sand.

Taxonomic Classification

Loamy, siliceous, semiactive, thermic Arenic Plinthic Paleudults

Typical Pedon

Lilbert loamy fine sand, 1 to 5 percent slopes (fig. 14); from the intersection of Texas Highway 7 and Loop 500 on the southwest side of Center, approximately 3.7 miles southwest on Texas Highway 7 to Farm Road 711, approximately 5.2 miles south on Farm Road 711 to the intersection with County Road 1286, approximately 1.6 miles west on County Road 1286 to the intersection with a timber company access road, 100 feet north of the intersection in conifers; Mount Herman, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 40 minutes 17.40 seconds N. and long. 94 degrees 16 minutes 48.30 seconds W.

A—0 to 6 inches; brown (10YR 4/3) loamy fine sand; weak fine subangular blocky structure; very friable, loose; common fine and medium roots throughout; common fine and medium pores; strongly acid; clear smooth boundary.

E—6 to 31 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine

subangular blocky structure; very friable, loose; common fine and medium roots throughout; common fine and medium pores; very strongly acid; clear smooth boundary.

Bt—31 to 39 inches; yellowish brown (10YR 5/6) sandy clay loam; 1 percent medium distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; firm, slightly hard; common fine and medium roots throughout; common fine and medium pores; 25 percent clay films on all faces of peds; strongly acid; clear smooth boundary.

Btv1—39 to 48 inches; yellowish brown (10YR 5/6) sandy clay loam; 10 percent medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, slightly hard; common fine and medium roots throughout; 25 percent clay films on all faces of peds; 5 percent plinthite nodules throughout; strongly acid; clear smooth boundary.

Btv2—48 to 58 inches; yellowish brown (10YR 5/6) sandy clay loam; 25 percent medium prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, hard; common medium roots throughout; 6 percent clay films on all faces of peds; 8 percent plinthite nodules throughout; very strongly acid; clear smooth boundary.

Btv/E1—58 to 66 inches; yellowish brown (10YR 5/8) sandy clay loam; 25 percent coarse prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, hard; common medium roots throughout; 7 percent discontinuous clay films on all faces of peds and 8 percent very pale brown (10YR 7/3) skeletans; 8 percent plinthite nodules throughout; very strongly acid; clear smooth boundary.

Btv/E2—66 to 80 inches; reddish yellow (7.5YR 6/8) sandy clay loam; 10 percent medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm, hard; common medium roots throughout; 6 percent discontinuous clay films on all faces of peds and 10 percent very pale brown (10YR 7/3) skeletans; 5 percent plinthite nodules throughout; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 60 to more than 80 inches. Depth to a horizon containing 5 to 15 percent plinthite ranges from 30 to 60 inches. The soil is dry in the moisture-control section for 75 to 90 cumulative days in most years. The weighted average clay content of the control section ranges from 20 to 30 percent. Base saturation at a depth of 72 inches ranges from 18 to 35 percent.

The thickness of the epipedon of loamy fine sand, the A and E horizons, ranges from 20 to 40 inches. The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. In some pedons under native vegetation, it has chroma of 1. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 or 4. Some pedons have a BE horizon. This horizon has chroma of 6 to 8. Reaction ranges from very strongly acid to slightly acid, except in limed areas.

The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 5 or 6, and chroma of 6 to 8. In some pedons, it has value of 5 and chroma of 4. The content of masses of oxidized iron with these colors and in other shades of red or brown and iron depletions in shades of gray ranges from none to common. Depth to iron depletions with chroma of 2 or less ranges from 30 to 60 inches. The content of nodular plinthite ranges from 0 to 4 percent, by volume. Reaction ranges from very strongly acid to moderately acid.

The Btv and Btv/E horizons have colors in shades of brown, red, and gray. The horizons are typically variegated with these colors. Texture is commonly sandy clay loam, but the range includes fine sandy loam. The content of nodular plinthite is 5 to 15 percent, by volume. The content of streaks, pockets, or coatings on peds of clean sand

ranges from few to about 10 percent, by volume. The content of brittle masses is 15 percent, by volume. Reaction ranges from very strongly acid to moderately acid.

Some pedons have a B_t or B_tC horizon in the lower part of the profile that is similar to the horizons above except that it has less than 5 percent plinthite or less than 5 percent E material.

The BC or C horizon, if it occurs, is typically stratified loamy deposits. Some pedons have stratified weakly consolidated sandstone of sandy clay loam or fine sandy loam.

Maben Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Side slope of drainageway on coastal plain

Parent material: Loamy and clayey material over shale

Geology: Wilcox Formation

Drainage class: Well drained

Permeability class: Moderately slow

Depth class: Moderately deep to a layer of densic material

Shrink-swell potential: High

Slope range: 5 to 15 percent

Associated Soils

- A soil similar to the Maben soils that has a loamy subsoil
- A soil that is developed to a depth of less than 20 inches
- Attoyac and Austonio soils, which have subsoils that are less clayey than those of the Maben soils
- Eastwood and Meth soils, which are developed to a depth of more than 40 inches
- Laneville and Dreka soils, which are on flood plains
- Metcalf soils, which are somewhat poorly drained
- Tenaha soils, which have thick sandy surface layers

Taxonomic Classification

Fine, mixed, active, thermic Ultic Hapludalfs

Typical Pedon

Maben fine sandy loam, 5 to 15 percent slopes (fig. 15); from the intersection of Texas Highway 87 and Farm Road 353 in the southeast corner of Shelby County, approximately 1.2 miles southwest on Farm Road 353 to the intersection with County Road 2907, approximately 0.66 mile south on County Road 2907; site is in a road cut on the east side of the county road, in conifers; Patroon South, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 34 minutes 44.70 seconds N. and long. 93 degrees 59 minutes 2.50 seconds W.

A—0 to 4 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; friable, soft; many fine to coarse roots; very strongly acid; clear smooth boundary.

Bt1—4 to 14 inches; yellowish red (5YR 4/6) clay loam; 10 percent medium faint reddish brown (5YR 4/4) mottles; moderate medium subangular blocky structure; firm, hard; many fine and medium roots and common coarse roots; 10 percent clay films on faces of peds; 2 percent noncalcareous sandstone fragments; very strongly acid; gradual smooth boundary.

Bt2—14 to 24 inches; yellowish red (5YR 4/6) clay loam; 10 percent fine and medium distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm, hard; common fine and medium roots; 10 percent clay films on faces of peds;

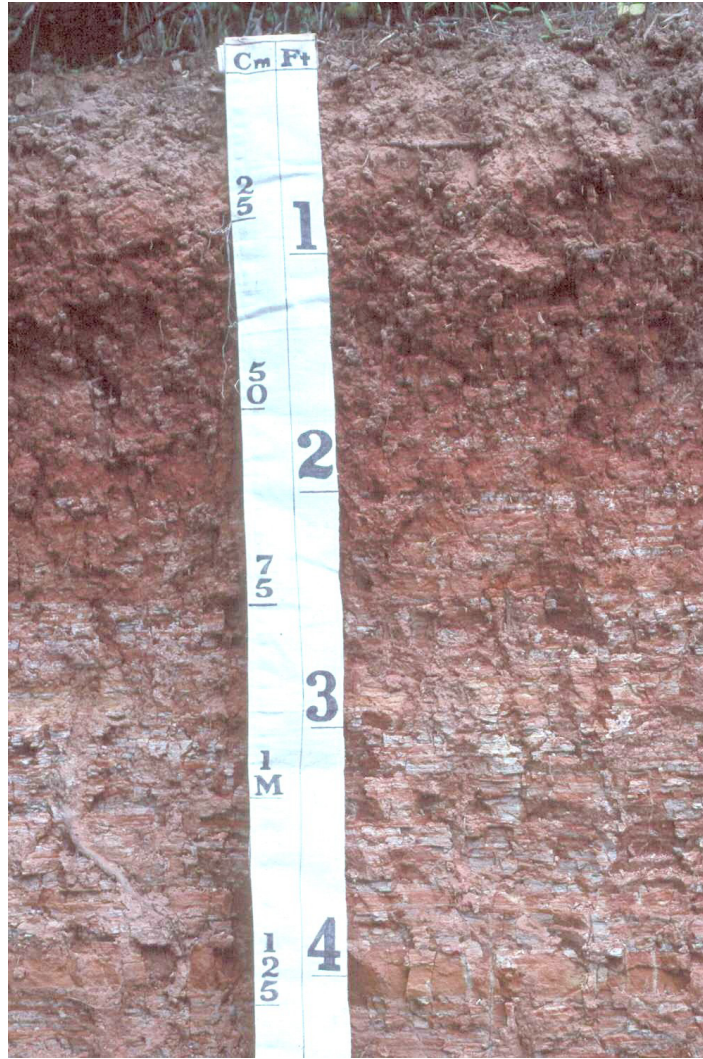


Figure 15.—A profile of Maben fine sandy loam. The layered CD horizon is evident.

10 percent (10YR 6/2) shale fragments; very strongly acid; gradual smooth boundary.

Bt/C—24 to 28 inches; yellowish brown (10YR 5/4) and reddish brown (5YR 5/4) silty clay loam; 1 percent medium faint reddish brown (5YR 4/4) mottles; weak fine subangular blocky structure; friable, slightly hard; common fine and medium roots; 5 percent clay films on faces of peds; common light brownish gray (10YR 6/2) shale strata; few yellowish red (5YR 4/6) strata; very strongly acid; gradual smooth boundary.

C—28 to 38 inches; light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), and strong brown (7.5YR 4/6) silt loam; weak platy structure parting to massive; firm, slightly hard; common medium roots in cracks; very strongly acid; gradual smooth boundary.

Cd—38 to 80 inches; light brownish gray (10YR 6/2) and light reddish brown (2.5YR 6/4) weathered bedrock; platy structure; very firm, very hard; common strata 6 inches thick of siltstone; shale strata 2 inches thick; few 0.25-inch-thick ironstone strata; very strongly acid.

Range in Characteristics

The thickness of the solum commonly ranges from 20 to 40 inches and but may be as much as 48 inches.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4. In eroded pedons, the A horizon commonly contains pockets of reddish clayey material derived from the upper part of the Bt horizon. Typically, the A horizon is fine sandy loam. Reaction ranges from very strongly acid to slightly acid.

The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 2 to 4, or it is mottled in shades of brown. Some pedons have a BE or EB horizon mottled in shades of red or brown. The E, BE, and EB horizons are fine sandy loam, sandy loam, or loam. Reaction is strongly acid to moderately acid.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8.

The content of mottles in shades of brown and yellow, if they occur, is few or common. Texture is clay, silty clay, silty clay loam, or clay loam. The particle-size control section, the upper 20 inches of the Bt horizon, has 35 to 55 percent clay. The content of soft weathered gray shale fragments, if they occur, are few to many. Reaction ranges from very strongly acid to moderately acid.

The BC or Bt/C horizon has the same range in color as the Bt horizon, or it is mottled in shades of red, gray, or yellow. It is clay, silty clay, clay loam, silty clay loam, loam, sandy clay loam, or fine sandy loam. In some pedons as much as 50 percent of the volume is laminated soft weathered shale. Reaction ranges from very strongly acid to moderately acid.

The thinly layered C or Cd horizon is variegated in shades of red, gray, and yellow. It is thinly laminated and consists of thinly bedded fine sands, loams, clays, clay shales, and limonitic lenses. The soft weathered shales commonly are rich in mica. Reaction ranges from very strongly acid to moderately acid.

Metcalf Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Marine terrace on coastal plain and stream terrace on coastal plain

Parent material: Loamy sediments over clayey deposits

Geology: Wilcox Formation

Drainage class: Somewhat poorly drained

Permeability class: Impermeable

Depth class: Very deep

Shrink-swell potential: High

Slope range: 0 to 2 percent

Associated Soils

- An unnamed soil that is not clayey in the lower part of the subsoil
- Dreka and Laneville soils, which are on flood plains
- Eastwood, Maben, and Meth soils, which have red clayey subsoils
- Gallime soils, which have surface layers that are thicker than those of the Metcalf soils and do not have clayey subsoils
- Latex soils, which are moderately well drained
- Mollville and Guyton soils, which are wetter than the Metcalf soils and gray throughout
- Timpson soils, which have coarse-silty subsoils

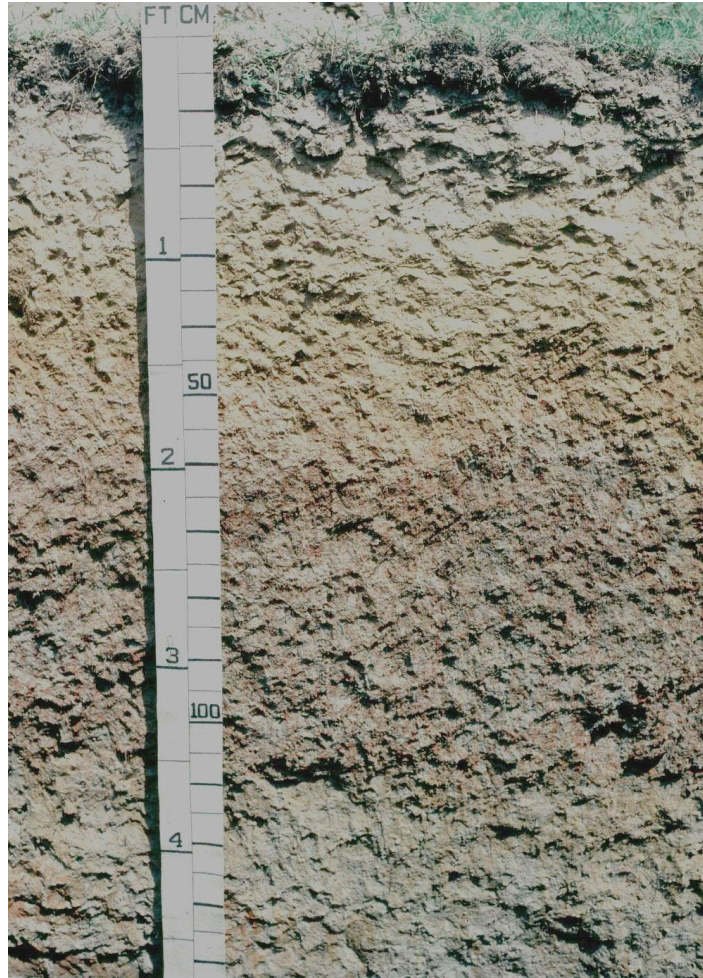


Figure 16.—A profile of Metcalf very fine sandy loam.

Taxonomic Classification

Fine-silty, siliceous, semiactive, thermic Aquic Glossudalfs

Typical Pedon

Metcalf very fine sandy loam in an area of Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded (fig. 16); from the intersection of Texas Highway 84 and Farm Road 947 in Tenaha, 2.3 miles northwest on Farm Road 947; site is 100 feet north of the road in a wooded area, in intermixed conifers and hardwoods; Tenaha West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 57 minutes 38.09 seconds N. and long. 94 degrees 16 minutes 8.43 seconds W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine subangular blocky structure parting to weak medium granular; very friable, soft; common fine and medium roots throughout; very strongly acid; gradual smooth boundary.

E/B—7 to 11 inches; 40 percent brownish yellow (10YR 6/6) and 60 percent pale brown (10YR 6/3) loam; weak medium subangular blocky structure; friable, slightly hard; common fine and medium roots throughout; common fine and medium pores; 2 percent clay films on all faces of peds; 1 percent fine faint yellowish brown

(10YR 5/6) masses of oxidized iron lining pores; extremely acid; gradual smooth boundary.

Bt/E1—11 to 17 inches; brownish yellow (10YR 6/6) loam; moderate medium subangular blocky structure; firm, hard; common medium roots; common fine and medium pores; 30 percent, by volume, tongues of albic material; 6 percent discontinuous clay films on all faces of peds; 1 percent fine distinct strong brown (7.5YR 5/6) masses of oxidized iron throughout; 1 percent fine distinct light brownish gray (10YR 6/2) iron depletions throughout; 30 percent pale brown (10YR 6/3) clay depletions; very strongly acid; clear wavy boundary.

Bt/E2—17 to 35 inches; pale brown (10YR 6/3) loam; moderate medium subangular blocky structure; firm, very hard; common medium roots throughout; 20 percent, by volume, tongues of albic material; 6 percent discontinuous clay films on all faces of peds; 10 percent fine and medium prominent light brownish gray (10YR 6/2) iron depletions throughout; 20 percent very pale brown (10YR 7/3) clay depletions; 30 percent medium and coarse prominent red (2.5YR 4/6) masses of oxidized iron; strongly acid; clear wavy boundary.

2Bt—35 to 80 inches; gray (10YR 6/1), red (2.5YR 4/6), and yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; extremely firm, extremely hard; common medium roots throughout; 6 percent discontinuous clay films on all faces of peds, 6 percent slickensides (pedogenic), and 6 percent pressure faces; strongly acid.

Range in Characteristics

The thickness of the solum ranges from 60 to about 100 inches. Depth to the clayey discontinuity ranges from 27 to 40 inches. Except for surface horizons that have been limed, soil reaction ranges from extremely acid to moderately acid throughout the solum.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Texture typically is silt loam or very fine sandy loam.

The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is silt loam, very fine sandy loam, or loam.

An E/B horizon occurs in some pedons. The E part of the E/B horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The B part has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. Texture is silt loam, loam, or very fine sandy loam in the E part and silty clay loam, silt loam, loam, or clay loam in the B part.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. The lower part of the Bt horizon has few or common iron depletions with chroma of 1 or 2. Texture is loam, silt loam, clay loam, or silty clay loam. Some pedons do not have a Bt horizon above the Bt/E horizon.

The Bt part of the Bt/E horizon is variegated with hue of 10YR, value of 5 or 6, and chroma of 2 to 6. It has few or common iron or clay depletions with chroma of 1 or 2. Texture is silty clay loam, silt loam, loam, or clay loam. The E part of the Bt/E horizon is grayish uncoated silt loam or very fine sandy loam.

The 2Btg or 2Bt horizon is variegated in shades of gray, red, and brown. Texture is silty clay, clay, silty clay loam, or clay loam that is more than 35 percent clay.

A 2Cg horizon occurs below a depth of 60 inches in some pedons. It is variegated in shades of gray and brown. Texture is loam, silt loam, very fine sandy loam, or fine sandy loam.

Meth Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Ridge on coastal plain

Soil Survey of Shelby County, Texas

Parent material: Loamy and clayey marine sediment

Geology: Wilcox Formation

Drainage class: Well drained

Permeability class: Moderately slow

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 1 to 5 percent

Associated Soils

- Eastwood soils, which have high shrink-swell clays in the subsoil
- Latex soils, which have brown or yellow loamy subsoils
- Lilbert and Tenaha soils, which have thick sandy surface layers
- Maben soils, which are 20 to 40 inches deep
- Metcalf soils, which are somewhat poorly drained
- Sawtown and Timpson soils, which are loamier than the Meth soils and have thicker surface layers

Taxonomic Classification

Fine, mixed, semiactive, thermic Ultic Hapludalfs

Typical Pedon

Meth fine sandy loam, 1 to 5 percent slopes; from the intersection of Farm Roads 2694 and 3172 at Huxley, approximately 0.9 mile south on Farm Road 3172, about 200 feet west of the road on a logging road on a narrow ridgetop, 10 feet south of the road in compartment #21 of the Sabine National Forest, in conifers; Logansport West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 44 minutes 53.27 seconds N. and long. 93 degrees 51 minutes 56.54 seconds W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many very fine to coarse roots throughout; moderately acid; clear wavy boundary. (Lab sample #003-22)

E—4 to 8 inches; brown (7.5YR 5/4) fine sandy loam; 2 percent fine prominent yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; friable; many very fine to coarse roots throughout; common very fine and fine vesicular pores; 2 percent fine yellowish red (5YR 4/6) masses of oxidized iron throughout; moderately acid; clear wavy boundary. (Lab sample #003-23)

Bt1—8 to 21 inches; red (2.5YR 4/6) clay; 1 percent fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm, hard; common coarse and many very fine to medium roots throughout; common very fine and fine vesicular pores; 1 percent discontinuous distinct black (10YR 2/1) iron stains on vertical faces of peds and 50 percent continuous prominent red (2.5YR 4/6) clay films throughout; 1 percent distinct black (10YR 2/1) manganese coatings on vertical faces of peds; strongly acid; diffuse wavy boundary. (Lab sample #003-24)

Bt2—21 to 30 inches; red (2.5YR 4/8) clay; 5 percent fine and medium prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; firm, hard; common coarse and many very fine to medium roots throughout; common very fine and fine vesicular pores; 1 percent discontinuous distinct black (10YR 2/1) iron stains on vertical faces of peds and 50 percent continuous prominent red (2.5YR 4/6) clay films throughout; 1 percent distinct black (10YR 2/1) manganese coatings on vertical faces of peds; strongly acid; gradual wavy boundary. (Lab sample #003-25)

Bt3—30 to 43 inches; red (2.5YR 5/8) sandy clay loam; 5 percent fine and medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak fine and medium subangular blocky; firm, hard; common fine and

medium roots throughout; common very fine and fine vesicular pores; 1 percent discontinuous distinct black (10YR 2/1) iron stains on vertical faces of peds and 30 percent discontinuous prominent red (2.5YR 4/6) clay films throughout; 1 percent distinct black (10YR 2/1) manganese coatings on vertical faces of peds; 1 percent irregular mica flakes throughout; few fine prominent (10YR 7/1) shale fragments; very strongly acid; gradual wavy boundary. (Lab sample #003-26)

BCt1—43 to 54 inches; red (2.5YR 5/8) sandy clay loam; 5 percent fine and medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak fine and medium subangular blocky; firm, hard; common fine and medium roots throughout; common very fine and fine vesicular pores; 1 percent discontinuous distinct black (10YR 2/1) iron stains on vertical faces of peds and 8 percent patchy distinct red (2.5YR 4/6) clay films throughout; 1 percent distinct black (10YR 2/1) manganese coatings on vertical faces of peds; 1 percent irregular mica flakes throughout; common fine and medium prominent (10YR 7/1) shale fragments; very strongly acid; clear wavy boundary. (Lab sample #003-27)

BCt2—54 to 69 inches; red (2.5YR 5/8) sandy clay loam; 8 percent fine and medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak fine and medium subangular blocky; firm, hard; common fine roots throughout; common very fine and fine vesicular pores; 2 percent discontinuous distinct black (10YR 2/1) iron stains on vertical faces of peds and 5 percent patchy distinct red (2.5YR 4/6) clay films throughout; 1 percent distinct black (10YR 2/1) manganese coatings on vertical faces of peds; 1 percent irregular mica flakes throughout; common fine and medium prominent (10YR 7/1) shale fragments; very strongly acid; clear wavy boundary. (Lab sample #003-28)

BC—69 to 85 inches; yellowish red (5YR 4/6) fine sandy loam; 10 percent fine and medium prominent light gray (10YR 7/2) mottles; weak medium angular blocky structure; friable, slightly hard; common fine roots throughout; common very fine and fine vesicular pores; 1 percent irregular mica flakes throughout; 10 percent 2.0- to 5.9-inch shale fragments; common medium and coarse prominent (10YR 7/1) shale fragments; ironstone strata 0.5 to 1.5 cm thick at the upper part of the horizon; fractures 5 to 7 mm wide filled with roots and clean sand pockets; very strongly acid. (Lab sample #003-29)

Range in Characteristics

The thickness of the solum ranges from 60 to 80 inches. Reaction ranges from strongly acid to slightly acid in the A and E horizons and from very strongly acid to moderately acid in the B horizon.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4.

Texture typically is fine sandy loam. The content of ironstone fragments ranges from 0 to 20 percent, by volume.

The E horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam, very fine sandy loam, or sandy loam and has ironstone fragments ranging from 0 to 20 percent, by volume.

The Bt horizon has hue of 5YR to 10R, value of 3 to 6, and chroma of 4 to 8. The content of mottles in shades of brown or yellow ranges from none to common. The upper part of the horizon is sandy clay loam, clay loam, sandy clay, or clay. The lower part is sandy clay loam, sandy loam, or fine sandy loam with ped coatings and streaks or pockets of yellowish or grayish sand or fine sandy loam.

The BC horizon has hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 4 to 8, or it is mottled in shades of red, yellow, or gray. It is sandy loam, sandy clay, sandy clay loam, or fine sandy loam with streaks or pockets of less clayey material.

A C or Cd horizon occurs below a depth of 60 inches in some pedons. It has dominant colors in shades of brown or gray, has lithochromic mottles and/or strata of these colors, and may or may not have yellowish colors. The material is

unconsolidated to weakly consolidated and slakes in water. Texture ranges from fine sandy loam to silty clay loam. Reaction is highly variable and ranges from extremely acid to neutral.

Mollville Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Tread of open depression on stream terrace

Parent material: Stratified loamy and sandy sediments

Geology: Fluvial terrace

Drainage class: Poorly drained

Permeability class: Slow

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 0 to 1 percent

Associated Soils

- Bernaldo soils, which are well drained
- Besner soils, which are coarse-loamy and better drained than the Mollville soils
- Gallime soils, which are fine-loamy and better drained than the Mollville soils
- Guyton soils, which have subsoils that are siltier than those of the Mollville soils
- Laneville, Dreka, and Iulus soils, which are on flood plains
- Metcalf soils, which are somewhat poorly drained
- Sawtown and Timpson soils, which are better drained than the Mollville soils

Taxonomic Classification

Fine-loamy, siliceous, active, thermic Typic Glossaqualfs

Typical Pedon

Mollville loam in an area of Mollville-Besner complex, 0 to 3 percent slopes, mounded; from the intersection of Farm Road 139 and Farm Road 2427 southeast of Shelbyville, approximately 2.2 miles northwest on County Road 2545 to the intersection with U.S. Forest Service Road 112, about 2.1 miles east on U.S. Forest Service Road 112 to a highline right-of-way, 1,600 feet northeast on the right-of-way, 200 feet west of the right-of-way in a low area between mounds, in compartment #27 of the Sabine National Forest, in hardwoods; Patroon North, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 43 minutes 22.00 seconds N. and long. 93 degrees 56 minutes 17.00 seconds W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; friable, soft; common fine and medium roots throughout; 1 percent coarse prominent very dark grayish brown (10YR 3/2) iron depletions throughout with diffuse boundaries; 1 percent medium prominent dark yellowish brown (10YR 3/4) masses of oxidized iron throughout with diffuse boundaries; very strongly acid; clear wavy boundary.

Eg—5 to 9 inches; gray (10YR 5/1) loam; weak medium subangular blocky structure; friable, slightly hard; many fine roots throughout; very strongly acid; clear irregular boundary.

Btg/E1—9 to 17 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm, slightly hard; common fine to coarse roots throughout; 6 percent clay films on all faces of peds; 10 percent fine and medium distinct dark yellowish brown (10YR 4/4) masses of oxidized iron lining pores with

diffuse boundaries; 20 percent light brownish gray (10YR 6/2) clay depletions with diffuse boundaries; very strongly acid; gradual wavy boundary.

Btg/E2—17 to 35 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm, slightly hard; common medium roots; 7 percent clay films on all faces of peds; 1 percent medium distinct yellowish brown (10YR 5/6) masses of oxidized iron lining pores with diffuse boundaries; 30 percent light brownish gray (10YR 6/2) clay depletions with diffuse boundaries; moderately acid; gradual wavy boundary.

Btg/E3—35 to 57 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm, slightly hard; common medium roots; 9 percent clay films on all faces of peds; 10 percent medium and coarse distinct strong brown (7.5YR 5/6) masses of oxidized iron in matrix with diffuse boundaries; 30 percent light brownish gray (10YR 6/2) clay depletions with diffuse boundaries; moderately acid; gradual wavy boundary.

BCtg/E—57 to 76 inches; grayish brown (10YR 5/2) loam; weak medium subangular blocky structure parting to massive; friable, soft; common fine roots; 3 percent clay films; 10 percent medium and coarse distinct strong brown (7.5YR 5/6) masses of oxidized iron in matrix with diffuse boundaries; 35 percent light brownish gray (10YR 6/2) clay depletions with diffuse boundaries; slightly alkaline; clear wavy boundary.

2C—76 to 80 inches; grayish brown (10YR 5/2) fine sandy loam; massive; loose; common medium roots throughout; 6 percent clay films on all faces of peds; 1 percent fine distinct strong brown (7.5YR 5/6) and 10 percent fine and medium faint light yellowish brown (10YR 6/4) masses of oxidized iron throughout with diffuse boundaries; slightly alkaline.

Range in Characteristics

The thickness of the solum ranges from 40 to more than 80 inches. Typically, where the solum is less than 60 inches thick, the soil is underlain by a sandy 2C horizon. The clay content of the control section ranges from 20 to 35 percent. Salinity ranges from nonsaline to slightly saline, and the sodium adsorption ratio ranges from 2 to 10 throughout the argillic horizon. About 20 to 40 percent of the sand fraction is coarser than very fine sand. The soil is dry in the moisture-control section for 50 cumulative days or more in most years.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. Texture typically is fine sandy loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas.

The Eg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. Texture is fine sandy loam, very fine sandy loam, loam, or silt loam. Reaction ranges from very strongly acid to moderately acid, except in limed areas. The combined thickness of the A and E horizons is 6 to 20 inches.

The Btg/E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 in the Bt part. The faces of some peds have darker coats than these colors. The content of iron accumulations in shades of brown, yellow, or red ranges from few to many. Texture is loam, sandy clay loam, or clay loam. The E part consists of albic material in the form of vertical intrusions, streaks, or pockets that occupy 5 to about 35 percent of the horizon. However, some subhorizon at least 2 inches in thickness has more than 15 percent intrusions of albic material. The E part has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. Reaction ranges from very strongly acid to moderately acid.

A BCtg/E horizon occurs in some pedons below the Btg/E horizon. It has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 in the BCt part. The content of iron accumulations in shades of brown, yellow, or red ranges from few to many. Texture is loam, sandy clay loam, or clay loam. The E part consists of albic material in the form of vertical intrusions, streaks, or pockets that make up 5 to about 35 percent of the

horizon. The E part has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. Reaction ranges from very strongly acid to slightly alkaline.

The Btg or BCtg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The faces of some pedis have darker coats than these colors. The content of iron accumulations in shades of brown, yellow, or red ranges from few to many. The content of streaks of albic material is none or few. Texture is loam, sandy clay loam, or clay loam. Reaction ranges from strongly acid to slightly alkaline.

The 2C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 4, with or without streaks and iron accumulations in shades of yellow, brown, or red. Texture is loamy fine sand or fine sandy loam, or it is stratified with these textures. The average clay content ranges from 3 to about 12 percent. Reaction ranges from strongly acid to slightly alkaline.

Owentown Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Flood plain on coastal plain

Parent material: Loamy alluvium

Geology: Alluvium

Drainage class: Moderately well drained

Permeability class: Moderate

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 1 percent

Associated Soils

- Dreka soils, which are wetter than the Owentown soils and gray throughout
- Iulus soils, which are slightly wetter than the Owentown soils
- Laneville soils, which are loamier and wetter than the Owentown soils
- Rentzel and Hainesville soils, which have thick sandy surface layers

Taxonomic Classification

Coarse-loamy, siliceous, active, thermic Oxyaquic Dystrudepts

Typical Pedon

Owentown fine sandy loam, 0 to 1 percent slopes, frequently flooded; from the intersection of Texas Highway 87 and Farm Road 417 in Shelbyville, 11.3 miles east on Farm Road 417, about 0.6 mile south of Forest Road 417 on County Road 2405, on south side of Pauls Creek channel, 50 feet west of the road in timber in compartment #12 of the Sabine National Forest, in conifers; Huxley, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 48 minutes 21.50 seconds N. and long. 93 degrees 56 minutes 0.66 seconds W.

A—0 to 6 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common medium and coarse roots; strongly acid; gradual smooth boundary.

Bw1—6 to 29 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common medium and coarse roots; 6 meq/100g cation-exchange capacity; 1 percent fine faint very pale brown (10YR 7/3) iron depletions; base saturation is 17 percent; strongly acid; gradual smooth boundary.

Bw2—29 to 35 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; common coarse roots; 6 meq/100g

cation-exchange capacity; 10 percent fine and medium faint very pale brown (10YR 7/3) iron depletions with diffuse boundaries; base saturation is 0 percent; strongly acid; clear smooth boundary.

Bw3—35 to 45 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine subangular blocky structure; very friable, soft; 10 percent fine and medium faint light brownish gray (10YR 6/2) iron depletions with diffuse boundaries; 10 percent fine and medium faint brownish yellow (10YR 6/6) masses of oxidized iron with diffuse boundaries; strongly acid; gradual smooth boundary.

Bg1—45 to 59 inches; light brownish gray (10YR 6/2) loam; weak fine subangular blocky structure; very friable, soft; 10 percent coarse distinct yellowish brown (10YR 5/6), 10 percent fine and medium distinct brownish yellow (10YR 6/6), and 10 percent fine and medium faint light yellowish brown (10YR 6/4) masses of oxidized iron with diffuse boundaries; strongly acid; clear smooth boundary.

Bg2—59 to 80 inches; light yellowish brown (10YR 6/4) and light gray (10YR 7/2) fine sandy loam; weak medium subangular blocky structure; friable, soft; 10 percent fine and medium distinct strong brown (7.5YR 5/6) masses of oxidized iron with diffuse boundaries; strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Reaction is strongly acid or moderately acid throughout the profile, except in limed areas. Base saturation ranges from 35 to 60 percent throughout the upper 30 inches of the solum. The average clay content of the control section ranges from 8 to 17 percent. Organic carbon exceeds 0.2 percent at a depth of 50 inches, or there is an irregular decrease of organic carbon in the particle-size control section.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4; hue of 7.5YR, value 3 or 4, and chroma of 2 to 4; or hue of 5YR, value of 4, and chroma of 3 or 4. It is less than 7 inches thick when the moist color value is 3. Texture typically is fine sandy loam.

The Bw horizon has hue of 10YR, value of 3 to 6, and chroma of 3 to 8 or hue of 7.5YR, value of 4 or 5, and chroma of 6. The content of redoximorphic features in shades of brown, yellow, red, or gray is few or common. Depth to redoximorphic depletions ranges from 24 to 48 inches below the surface. Strata or pockets of loamy fine sand or sandy clay loam 1 to 3 centimeters thick make up less than 15 percent, by volume. The weighted average texture is fine sandy loam or loam. However, layers with texture of loamy fine sand are common in the upper part of the horizon.

A buried A horizon occurs in some pedons at a depth of 20 to 40 inches below the surface. It has colors and textures similar to those of the A horizon.

A Bg horizon occurs in some pedons below a depth of 40 inches. It has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The content of redoximorphic features in shades of brown, yellow, or gray ranges from few to many. Texture is fine sandy loam, loam, or loamy fine sand with or without strata of these textures or sandy clay loam.

The BC or BCg horizon, if it occurs, has colors mainly in shades of brown and gray. In some pedons it has few or common yellowish or reddish redoximorphic concentrations. Texture is loamy fine sand, fine sandy loam, or loam with or without strata of these textures or sandy clay loam.

Rentzel Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Toeslope of drainageway on coastal plain

Parent material: Sandy and loamy marine deposits

Geology: Carrizo Formation

Soil Survey of Shelby County, Texas

Drainage class: Moderately well drained

Permeability class: Moderately slow

Depth class: Very deep

Shrink-swell potential: Low

Slope range: 0 to 5 percent

Associated Soils

- An unnamed sandy soil that has a black mucky surface layer
- Cuthbert soils, which do not have sandy surface layers and are clayey
- Darco soils, which have surface layers that are more than 40 inches thick
- Iulus, Dreka, and Owentown soils, which are on flood plains
- Lilbert soils, which do not have gray wetness mottles in the upper part of the subsoil
- Tenaha soils, which are 40 to 60 inches deep

Taxonomic Classification

Loamy, siliceous, semiactive, thermic Arenic Plinthaquic Paleudults

Typical Pedon

Rentzel loamy fine sand, 0 to 5 percent slopes; from the intersection of Texas Highway 7 and County Road 1168 in Mt. Herman, east and northeast on County Road 1168 to the intersection with County Road 1273, about 150 feet south on County Road 1273, about 35 feet east of the road, in intermixed conifers and hardwoods; Mount Herman, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 42 minutes 30.00 seconds N. and long. 94 degrees 16 minutes 7.00 seconds W.

- A—0 to 9 inches; grayish brown (10YR 5/2) loamy fine sand; weak fine subangular blocky structure; friable, loose; few fine and medium roots; extremely acid; clear smooth boundary.
- E—9 to 24 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine subangular blocky structure; friable, loose; few fine and medium roots; very strongly acid; clear smooth boundary.
- Bt1—24 to 28 inches; brownish yellow (10YR 6/6) fine sandy loam; weak medium subangular blocky structure; friable, slightly hard; few fine and medium roots; 10 percent discontinuous clay films on all faces of peds; 1 percent flat 0.1- to 3.0-inch ironstone nodules; extremely acid; clear smooth boundary.
- Bt2—28 to 35 inches; brownish yellow (10YR 6/6) sandy clay loam; moderate medium subangular blocky structure; firm, hard; few fine and medium roots; common fine and medium pores; 15 percent discontinuous clay films on all faces of peds; 1 percent fine and medium distinct light brownish gray (10YR 6/2) iron depletions with diffuse boundaries; 1 percent coarse prominent red (2.5YR 4/6) and 10 percent medium prominent red (2.5YR 4/6) masses of oxidized iron; 2 percent dark red (2.5YR 3/6) plinthite nodules; very strongly acid; gradual smooth boundary.
- Bt3—35 to 48 inches; brownish yellow (10YR 6/8) sandy clay loam; moderate medium subangular blocky structure; firm, hard; common fine and medium pores; 15 percent discontinuous clay films on all faces of peds; 3 percent dark red (2.5YR 3/6) plinthite nodules; 10 percent medium and coarse prominent red (2.5YR 4/6) masses of oxidized iron with diffuse boundaries; 10 percent medium and coarse distinct light brownish gray (10YR 6/2) iron depletions with diffuse boundaries; very strongly acid; gradual smooth boundary.
- Btv1—48 to 57 inches; brownish yellow (10YR 6/8) sandy clay loam; moderate medium subangular blocky structure; firm, hard; common fine and medium pores; 15 percent discontinuous clay films on all faces of peds; 1 percent coarse prominent light brownish gray (10YR 6/2) and 10 percent medium prominent light brownish gray (10YR 6/2) iron depletions with diffuse boundaries; 1 percent

medium prominent red (2.5YR 4/6) and 10 percent coarse prominent red (2.5YR 4/6) masses of oxidized iron with diffuse boundaries; 8 percent dark red (2.5YR 3/6) plinthite nodules; very strongly acid; gradual smooth boundary.

Btv2—57 to 80 inches; brownish yellow (10YR 6/8), light brownish gray (10YR 6/2), and red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; firm, hard; common fine and medium pores; 15 percent discontinuous clay films on all faces of peds; 8 percent dark red (2.5YR 3/6) plinthite nodules; extremely acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. The soil is dry in some part of the moisture-control section in most years for 75 to 90 days. Depth to a horizon containing more than 5 percent plinthite is 30 to 60 inches. The combined thickness of the A and E horizons ranges from 20 to 40 inches.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 or 3.

Texture is loamy fine sand. Reaction ranges from extremely acid to moderately acid, except in limed areas.

The E horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 4. The content of iron or clay depletions in shades of gray ranges from few to many in the lower part of the E horizon. Texture is loamy fine sand. Reaction ranges from extremely acid to moderately acid, except in limed areas.

The Bt horizon has matrix colors in hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. The content of redoximorphic features in shades gray, brown, yellow, or red ranges from few to many. Some pedons have a mixed matrix of these colors. Iron depletions with chroma of 2 or less are within the upper 5 inches of the Bt horizon. Texture is fine sandy loam or sandy clay loam. The content of nodular plinthite ranges from 0 to 4 percent. Reaction ranges from extremely acid to strongly acid.

The Btv horizon has matrix colors with hue of 5YR to 10YR, value of 5 to 7, and chroma of 1 to 6. The content of redoximorphic features in shades of red, yellow, brown, or gray ranges from few to many. Some pedons have a mixed matrix of these colors. The extent of colors with chroma of 2 or less commonly increases as depth increases. Texture is fine sandy loam or sandy clay loam. Nodular plinthite ranges from 5 to 15 percent. Reaction ranges from extremely acid to strongly acid. Some pedons have a Bt' horizon. This horizon is similar to the Btv horizon but has less than 5 percent plinthite.

Sacul Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Interfluvium on coastal plain

Parent material: Loamy and clayey marine sediments

Geology: Carrizo and Reklaw Formations

Drainage class: Moderately well drained

Permeability class: Slow

Depth class: Deep to a layer of densic material

Shrink-swell potential: High

Slope range: 1 to 5 percent

Associated Soils

- Bowie soils, which have brown loamy subsoils
- Cuthbert and Maben soils, which are 20 to 40 inches deep
- Dreka, Laneville, and Iulus soils, which are on flood plains
- Kirvin and Meth soils, which are well drained

- Lilbert and Tenaha soils, which have thick sandy surface layers
- Metcalf soils, which are somewhat poorly drained
- Rentzel soils, which have thick sandy surface layers

Taxonomic Classification

Fine, mixed, active, thermic Aquic Hapludults

Typical Pedon

Sacul fine sandy loam, 1 to 5 percent slopes; from the intersection of U.S. Highway 96 and Farm Road 2026 in Center, 4.2 miles northwest on Farm Road 2026 to the intersection with County Road 1464, about 0.6 mile southwest on County Road 1464, about 100 feet northeast in cut-over timber, in intermixed conifers and hardwoods; Arcadia, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 50 minutes 43.30 seconds N. and long. 94 degrees 16 minutes 4.95 seconds W.

- A—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; friable, soft; common fine and medium roots throughout; common fine and medium pores; 10 percent medium distinct yellowish brown (10YR 5/6) masses of oxidized iron throughout; strongly acid; clear smooth boundary.
- E—7 to 12 inches; brown (7.5YR 5/4) fine sandy loam; weak fine subangular blocky structure; friable, soft; common fine and medium roots throughout; common fine and medium pores; strongly acid; clear wavy boundary.
- Bt1—12 to 20 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, hard; common fine and medium roots throughout; common fine and medium pores; 7 percent continuous clay films on all faces of peds; extremely acid; clear smooth boundary.
- Bt2—20 to 28 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, hard; common fine roots throughout; common fine and medium pores; 28 percent continuous clay films on all faces of peds; 5 percent fine and medium prominent light yellowish brown (10YR 6/4) and 5 percent fine and medium prominent light brownish gray (10YR 6/2) iron depletions throughout; very strongly acid; clear smooth boundary.
- Bt3—28 to 31 inches; 30 percent brownish yellow (10YR 6/6), 30 percent light brownish gray (10YR 6/2), and 40 percent dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, hard; common fine and medium roots throughout; common fine and medium pores; 28 percent patchy clay films on all faces of peds; 4 percent flat subangular ironstone nodules; very strongly acid; clear smooth boundary.
- Btg—31 to 43 inches; light brownish gray (10YR 6/2) clay; moderate medium subangular blocky structure; very firm, very hard; common medium roots throughout; common medium pores; 8 percent discontinuous clay films on all faces of peds; 1 percent medium distinct brownish yellow (10YR 6/6) and 21 percent medium and coarse prominent dark red (2.5YR 3/6) masses of oxidized iron throughout; strongly acid; clear smooth boundary.
- BCg—43 to 49 inches; light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; firm, hard; common fine roots throughout; common fine pores; 5 percent medium and coarse distinct brownish yellow (10YR 6/8), 5 percent medium and coarse prominent red (2.5YR 4/6), and 5 percent medium and coarse distinct brownish yellow (10YR 6/6) masses of oxidized iron throughout; extremely acid; clear smooth boundary.
- Cd—49 to 80 inches; 30 percent brownish yellow (10YR 6/8), 35 percent gray (10YR 5/1), and 35 percent light brownish gray (10YR 6/2) sandy clay loam; massive; firm, hard; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 40 to more than 80 inches. Depth to the top of the argillic horizon ranges from 4 to 17 inches. Depth to the paralithic contact ranges from 40 to more than 80 inches. Reaction ranges from moderately acid to very strongly acid in the A and E horizons and from strongly acid to extremely acid in the Bt, BC, and C horizons. Base saturation is commonly less than 25 percent at 50 inches below the top of the Bt horizon. The calcium-magnesium ratio is less than 1. The content of fragments of ironstone and quartz that are 2 to 75 mm in diameter ranges from 0 to 60 percent, by volume, in the A and E horizons. The content of fragments of ironstone, quartz, or shale ranges from 0 to 10 percent in the Bt, BC, and C horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2, 3, or 4. Where value is 3, the A horizon is less than 6 inches thick. In cultivated areas, the Ap horizon has hue of 10YR, value of 5, and chroma of 3 or 4 or hue of 7.5YR, value of 5, and chroma of 4. Texture typically is fine sandy loam.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4.

Texture commonly is very fine sandy loam, fine sandy loam, sandy loam, or loam or their gravelly and very gravelly analogs; however, the range also includes loamy fine sand and loamy sand.

The Bt1 horizon has hue of 5YR, value of 4, and chroma of 6; hue of 5YR, value of 5, and chroma of 6 to 8; hue of 2.5YR or 10R, value of 3, and chroma of 6; or hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 to 8. Texture is clay, silty clay, or sandy clay.

The Bt2 horizon has hue of 5YR, value of 4, and chroma of 6; hue of 5YR, value of 5, and chroma of 6 to 8; hue of 2.5YR or 10R, value of 3, and chroma of 6; or hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 to 8. Texture is silty clay, sandy clay, or clay. Iron accumulations and depletions are in shades of gray or brown.

The Bt3 and Bt4 horizons have hue of 5YR, value of 4, and chroma of 6; hue of 5YR, value of 5, and chroma of 6 to 8; hue of 2.5YR, value of 3, and chroma of 6; or hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. They have iron accumulations and depletions in shades of gray, yellow, or brown or are variegated in shades of red, gray, or brown. Texture is silty clay, clay, sandy clay, or clay loam.

The Btg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 or hue of 2.5Y, value of 5 or 6, and chroma of 2. Texture is silty clay loam, clay loam, sandy clay loam, or sandy clay. Iron accumulations and depletions are in shades of red, gray, or brown.

The BC horizon is variegated in shades of gray, red, or brown. The extent of these colors is about equal, or gray or red is dominant. Texture is silty clay loam, sandy clay loam, clay loam, loam, or very fine sandy loam.

The C horizon, if it occurs, is variegated in shades of gray, red, or brown and is stratified. The extent of these colors is about equal, or gray or red is dominant. Texture is clay loam, sandy clay loam, sandy loam, very fine sandy loam, fine sandy loam, silt loam, or silty clay loam.

The Cd horizon, if it occurs, is composed of soft, platy, clayey shale. The horizon is gray with red and brown iron accumulations or is equally variegated in shades of gray, red, and brown. Thickness of the Cd horizon is variable and can be several feet thick, or alternating layers of clayey shale and sandy sediments can occur.

Sawtown Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Circular to elongated mound on marine terrace

Parent material: Loamy over clayey deposits

Geology: Wilcox Formation

Drainage class: Well drained

Permeability class: Very slow

Depth class: Very deep

Shrink-swell potential: High

Slope range: 0 to 2 percent

Associated Soils

- Eastwood and Meth soils, which have red clayey subsoils
- Gallime soils, which are not clayey in the lower part of the subsoil
- Latex soils, which do not have thick surface layers
- Maben and Cuthbert soils, which are 20 to 40 inches deep
- Metcalf and Alazan soils, which are wetter than the Sawtown soils and do not have thick surface layers
- Mollville and Guyton soils, which are wetter than the Sawtown soils and gray throughout

Taxonomic Classification

Fine-loamy, siliceous, active, thermic Typic Glossudalfs

Typical Pedon

Sawtown very fine sandy loam in an area of Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded; from the intersection of Texas Highway 84 and Farm Road 947 in Tenaha, 2.3 miles northwest on Farm Road 947, about 100 feet north in timber on a mound, in intermixed conifers and hardwoods; Tenaha West, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 57 minutes 38.09 seconds N. and long. 94 degrees 16 minutes 6.40 seconds W.

A—0 to 11 inches; brown (10YR 5/3) very fine sandy loam; weak medium subangular blocky structure; very friable, soft; common fine and medium roots; 1 percent fine dark grayish brown (10YR 4/2) masses of oxidized iron lining pores; very strongly acid; gradual smooth boundary.

E1—11 to 25 inches; pale brown (10YR 6/3) very fine sandy loam; weak fine subangular blocky structure; very friable, soft; common fine and medium roots; strongly acid; gradual smooth boundary.

E2—25 to 30 inches; pale brown (10YR 6/3) very fine sandy loam; weak medium subangular blocky structure; very friable, soft; common fine and medium roots; 6 percent fine and medium yellowish brown (10YR 5/6) masses of oxidized iron throughout; strongly acid; clear wavy boundary.

Bt/E1—30 to 37 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; firm, very hard; common fine and medium roots; 18 percent, by volume, tongues of albic material; 26 percent distinct clay films on all faces of peds; 10 percent fine and medium prominent red (2.5YR 4/6) masses of oxidized iron throughout; 18 percent pale brown (10YR 6/3) clay depletions; clay depletions are tongues of very fine sandy loam (E material); very strongly acid; clear wavy boundary.

Bt/E2—37 to 49 inches; brownish yellow (10YR 6/8) loam; moderate medium subangular blocky structure; firm, very hard; 20 percent, by volume, tongues of albic material; 26 percent distinct clay films on all faces of peds; 1 percent fine faint light brownish gray (10YR 6/2) iron depletions throughout; 10 percent medium distinct red (2.5YR 4/6) masses of oxidized iron throughout; 20 percent pale brown (10YR 6/3) clay depletions; clay depletions are tongues of very fine sandy loam (E material); very strongly acid; clear wavy boundary.

2Btg/E—49 to 80 inches; gray (10YR 5/1) clay loam; weak medium subangular blocky structure; very firm, extremely hard; 6 percent distinct clay films on all faces of peds; 10 percent fine and medium distinct brownish yellow (10YR 6/6) and 10 percent medium and coarse prominent red (10R 4/8) masses of oxidized iron throughout; 16 percent pale brown (10YR 6/3) clay depletions; very strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Base saturation ranges from 45 to 80 percent at 50 inches below the top of the argillic horizon. The average clay content of the control section ranges from 18 to 27 percent. Depth to the clayey discontinuity ranges from 40 to 60 inches. Thickness of the epipedon ranges from 15 to 35 inches. Thickness of the glossic horizon is more than 20 inches.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 or 3. Where value is 3, the horizon is less than 7 inches thick. Texture typically is very fine sandy loam. The content of rounded ironstone or quartzite pebbles is none or few. Reaction ranges from very strongly acid to slightly acid.

The E horizon has hue 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 4. Texture is fine sandy loam, very fine sandy loam, or loam. The content of rounded ironstone or quartzite pebbles is none or few. Reaction ranges from very strongly acid to moderately acid.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The content of redoximorphic concentrations in shades of red, brown, or yellow ranges from none to common. Texture is loam, sandy clay loam, or clay loam. The content of brittle peds ranges from 0 to about 15 percent, by volume. The content of rounded ironstone or quartzite pebbles ranges from 0 to about 4 percent. Reaction ranges from extremely acid to moderately acid.

A Bt/E horizon occurs in some pedons below or instead of the Bt horizon. It has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8 in the Bt part. It contains 5 to 25 percent albic material (E part). The content of redoximorphic concentrations in shades of red, brown, or yellow ranges from none to common. The content of iron or clay depletions in shades of gray is none or few. Texture is loam, sandy clay loam, or clay loam. The content of brittle peds ranges from 0 to about 15 percent, by volume. The content of rounded ironstone or quartzite pebbles ranges from 0 to about 4 percent. Reaction ranges from extremely acid to moderately acid.

The 2Btg/E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 1 or 2. The content of redoximorphic concentrations in shades of red, brown, or yellow and iron depletions in shades of gray ranges from few to many. Some pedons have a 2Bt/E horizon that is variegated with these colors. The content of streaks and pockets of albic material ranges from 15 to 25 percent. Texture is clay loam or clay, and the clay content generally ranges from 35 to 50 percent. In some pedons, however, the clay content is less than 35 percent and the texture is clay loam, sandy clay loam, or fine sandy loam below a depth of 60 inches. The content of gypsum crystals and/or fine masses of barite ranges from none to common. Reaction ranges from extremely acid to slightly acid.

A 2Btg or 2BCg horizon occurs in some pedons and is below a depth of 60 inches. It has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 1 or 2. The content of redoximorphic concentrations in shades of red, brown, or yellow and iron depletions in shades of gray ranges from few to many. Some pedons have a 2Bt horizon that is variegated with these colors. Texture is clay loam or clay, and the clay content generally ranges from 35 to 50 percent. In some pedons, however, the clay content is less than 35 percent and the texture is clay loam, sandy clay loam, or fine sandy loam. The content of gypsum crystals and/or fine masses of barite ranges from none to common. Reaction ranges from extremely acid to slightly acid.

Tenaha Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Geomorphic setting: Side slope of drainageway on coastal plain

Parent material: Sandy stratified sandstone and shale

Geology: Carrizo Formation

Drainage class: Well drained

Permeability class: Moderately slow

Depth class: Deep to bedrock (densic layer)

Shrink-swell potential: Low

Slope range: 5 to 15 percent

Associated Soils

- An unnamed sandy soil that has a black mucky surface layer
- Betis soils, which are sandy throughout
- Cuthbert, Meth, and Kirvin soils, which have red clayey subsoils
- Darco soils, which have surface layers more than 40 inches thick
- Iulus soils, which are on narrow flood plains
- Lilbert and Rentzel soils, which are more than 60 inches deep

Taxonomic Classification

Loamy, siliceous, semiactive, thermic Arenic Hapludults

Typical Pedon

Tenaha loamy fine sand, 5 to 15 percent slopes; from the intersection of Texas Highway 87 and Farm Road 139 southeast of Shelbyville, 3.8 miles east on Farm Road 139 to Farm Road 3184, about 3.6 miles east on Farm Road 3184 to the end of state maintenance, approximately 0.6 mile northeast on U.S. Forest Service Road 126 to U.S. Forest Service Road 147, approximately 0.25 mile east on U.S. Forest Service Road 147 to a powerline, approximately 400 feet south along the powerline, 70 feet east (uphill) of the powerline in compartment #38 of the Sabine National Forest, in intermixed conifers and hardwoods; Brushy Creek, Louisiana USGS 7.5 Minute Quadrangle; lat. 31 degrees 41 minutes 43.03 seconds N. and long. 93 degrees 50 minutes 30.89 seconds W.

- A—0 to 2 inches; dark grayish brown (10YR 4/2) loamy fine sand; single grain; friable, loose; common fine and medium roots; strongly acid; gradual smooth boundary.
- E1—2 to 6 inches; light yellowish brown (10YR 6/4) loamy fine sand; 10 percent medium distinct brown (10YR 4/3) mottles; single grain; friable, loose; common fine and medium and few coarse roots; moderately acid; gradual smooth boundary.
- E2—6 to 29 inches; light yellowish brown (10YR 6/4) loamy fine sand; 1 percent fine faint brownish yellow (10YR 6/6) and 1 percent fine faint pale brown (10YR 6/3) mottles; single grain; friable, loose; common fine and medium roots; very strongly acid; gradual smooth boundary.
- Bt1—29 to 35 inches; yellowish brown (10YR 5/6) sandy clay loam; 1 percent fine and medium distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm, slightly hard; few fine and common medium roots; 14 meq/100g cation-exchange capacity; 20 percent clay films on faces of peds; very strongly acid; clear smooth boundary.
- Bt2—35 to 41 inches; yellowish brown (10YR 5/6) sandy clay loam; 1 percent fine and medium distinct yellowish red (5YR 5/8) and 10 percent medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm, slightly hard; common medium roots; 12 meq/100g cation-exchange capacity; 25 percent clay films on faces of peds; very strongly acid; gradual smooth boundary.

BtC—41 to 55 inches; yellowish brown (10YR 5/6) fine sandy loam; 10 percent medium distinct yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure; friable, soft; common medium roots; 15 percent clay films on faces of peds; 10 percent 0.1- to 3.0-inch shale fragments; very strongly acid; gradual smooth boundary.

Cd/Bt—55 to 75 inches; pale brown (10YR 6/3), red (2.5YR 4/6), and yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure parting to platy; friable, slightly hard; 11 meq/100g cation-exchange capacity; base saturation at a depth of 72 inches is 18 percent; very strongly acid; gradual smooth boundary.

Cd—75 to 80 inches; light gray (10YR 7/2) and reddish brown (5YR 4/4) weathered bedrock; 10 percent fine and medium distinct brownish yellow (10YR 6/8) mottles; platy structure; firm, hard; very strongly acid.

Range in Characteristics

The thickness of the solum ranges from 40 to 60 inches. The weighted average clay content of the particle-size control ranges from 23 to 35 percent. The content of quartzite and ironstone pebbles ranges from 0 to 14 percent, by volume, throughout the profile. The combined thickness of the A and E horizons ranges from 20 to 40 inches.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4.

Texture typically is loamy fine sand. Reaction ranges from very strongly acid to moderately acid.

The E horizon has color values that are 1 to 3 units greater than those of the A horizon. Some pedons have an EB horizon that has chroma of 6 to 8. Texture is fine sand or loamy fine sand. Reaction ranges from very strongly acid to moderately acid.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. Some pedons are mixed with these colors as well as have red redoximorphic concretions with hue of 2.5YR. Texture is fine sandy loam or sandy clay loam or, less commonly, clay loam. The content of relict redoximorphic depletions or remnants of weathered shale ranges from 0 to 5 percent, by volume. Mica flakes occur in the lower part of the horizon in some pedons. Reaction ranges from extremely acid to strongly acid.

A BCt horizon occurs in many pedons. It has reddish, yellowish, and brownish matrix colors and commonly has redoximorphic features or is stratified with these colors. The content of discontinuous strata or pockets of grayish weathered shale ranges from 0 to 15 percent, by volume. Texture is fine sandy loam or sandy clay loam with or without strata of shale or sandstone. The horizon has few or common mica flakes in most pedons. Reaction ranges from extremely acid to strongly acid.

The C or Cd horizon is stratified weakly consolidated sandstone with fine sandy loam or sandy clay loam texture and shaly soil materials. The loamy materials and sandstone are reddish, yellowish, or brownish, and the shaly materials are mainly grayish with a clay loam or clay texture. The shaly material is variable in amount and does not occur in some pedons. Roots penetrate these materials but are concentrated along fractures or cleavage planes. The material slakes in water. Most pedons have clay flows along some vertical fractures. Many pedons have discontinuous, fractured, strongly cemented, or indurated sandstone or ironstone layers about 1 inch to 4 inches thick. The layers appear to have the slope of an ancient surface gradient and are also within the argillic horizon of some pedons. Reaction ranges from extremely acid to strongly acid.

Timpson Series

Major Land Resource Area: Western Coastal Plain

Local physiographic area: East Texas Timberlands

Soil Survey of Shelby County, Texas

Geomorphic setting: Mound on stream terrace and mound on marine terrace

Parent material: Loamy over clayey deposits

Geology: Wilcox Formation

Drainage class: Moderately well drained

Permeability class: Moderately slow

Depth class: Very deep

Shrink-swell potential: Moderate

Slope range: 0 to 2 percent

Associated Soils

- Alazan and Gallime soils, which are not clayey in the lower part of the subsoil
- Eastwood, Meth, and Maben soils, which have red clayey subsoils
- Laneville and Dreka soils, which are on flood plains
- Mollville and Guyton soils, which are wetter than the Timpson soils and gray throughout
- Sawtown soils, which have fine-loamy subsoils

Taxonomic Classification

Coarse-silty, siliceous, semiactive, thermic Oxyaquic Glossudalfs

Typical Pedon

Timpson silt loam in an area of Metcalf-Timpson complex, 0 to 2 percent slopes, mounded; from the intersection of Farm Road 417 and Texas Highway 87 in Shelbyville, approximately 11 miles northeast on Farm Road 417 to Farm Road 139, about 1.4 miles north on Farm Road 139, about 0.6 mile west on a logging road, 500 feet northwest on a skid trail in compartment #8 of the Sabine National Forest, in intermixed conifers and hardwoods; Huxley, Texas USGS 7.5 Minute Quadrangle; lat. 31 degrees 50 minutes 9.10 seconds N. and long. 93 degrees 56 minutes 58.80 seconds W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; friable, soft; many fine to coarse roots throughout; strongly acid; clear smooth boundary.

E—7 to 13 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak medium subangular blocky structure; very friable, soft; many fine to coarse roots throughout; very strongly acid; clear smooth boundary.

BE—13 to 20 inches; strong brown (7.5YR 5/6) very fine sandy loam; moderate fine subangular blocky structure parting to moderate medium subangular blocky; very friable, soft; many fine to coarse roots throughout; 1 percent fine faint reddish yellow (5YR 6/6) masses of oxidized iron; 1 percent fine distinct yellow (10YR 7/6) masses of oxidized iron; extremely acid; clear smooth boundary.

Bt1—20 to 27 inches; strong brown (7.5YR 5/8) loam; weak coarse prismatic structure parting to weak fine subangular blocky; friable, slightly hard; common fine to coarse roots throughout; common fine and medium and many very fine pores; 6 percent faint clay films on all faces of peds; 1 percent fine distinct red (2.5YR 4/6) masses of oxidized iron; very strongly acid; clear smooth boundary.

Bt2—27 to 34 inches; strong brown (7.5YR 5/6) loam; weak coarse prismatic structure parting to weak fine subangular blocky; friable, slightly hard; few fine to coarse roots; common fine and medium and many very fine pores; 6 percent faint clay films on all faces of peds; 1 percent fine faint reddish yellow (7.5YR 6/8) masses of oxidized iron; 1 percent fine iron-manganese nodules; very strongly acid; clear smooth boundary.

Bt3—34 to 43 inches; yellowish brown (10YR 5/6) loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable, slightly hard; few fine to coarse roots; many fine, common medium, and few coarse pores; 6 percent

faint clay films on all faces of peds; 1 percent fine and medium iron-manganese nodules; 1 percent medium faint reddish yellow (7.5YR 6/6) masses of oxidized iron; 2 percent pale brown (10YR 6/3) clay depletions; 5 percent medium distinct yellowish red (5YR 5/6) masses of oxidized iron; about 20 percent of horizon is brittle; very strongly acid; clear smooth boundary.

Bt/E—43 to 52 inches; light yellowish brown (10YR 6/4) loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable, hard; few fine to coarse roots; common fine and medium pores; 33 percent, by volume, tongues of albic material; 5 percent faint clay films on all faces of peds and 5 percent faint grayish brown (10YR 5/2) clay films on vertical faces of peds; 1 percent fine prominent red (2.5YR 4/8), 10 percent fine prominent yellowish red (5YR 4/8), and 10 percent medium prominent red (2.5YR 5/8) masses of oxidized iron; 33 percent light gray (10YR 7/2) clay depletions; clay depletions are tongues of very fine sandy loam (E part); about 10 percent of horizon is brittle; very strongly acid; abrupt irregular boundary.

2Btg/E—52 to 55 inches; light brownish gray (10YR 6/2) clay loam; weak coarse prismatic structure parting to weak fine subangular blocky; very firm, extremely hard; few fine and medium roots; few fine pores; 42 percent, by volume, tongues of albic material; 5 percent clay films on all faces of peds; 1 percent fine distinct brownish yellow (10YR 6/6) and 10 percent medium and coarse prominent red (2.5YR 4/6) masses of oxidized iron; 42 percent light gray (10YR 7/2) clay depletions; clay depletions are tongues of very fine sandy loam (E part); very strongly acid; clear smooth boundary.

2Btg1—55 to 61 inches; gray (10YR 6/1) clay loam; weak coarse prismatic structure parting to moderate fine subangular blocky; very firm, extremely hard; few fine and medium roots; few fine pores; 5 percent pressure faces on all faces of peds and 5 percent slickensides (pedogenic); 1 percent fine distinct strong brown (7.5YR 5/6) and 8 percent medium and coarse prominent red (2.5YR 4/6) masses of oxidized iron; very strongly acid; gradual wavy boundary.

2Btg2—61 to 73 inches; light brownish gray (10YR 6/2) clay loam; weak coarse prismatic structure parting to moderate fine subangular blocky; very firm, extremely hard; few fine and medium roots; few fine pores; 5 percent pressure faces on all faces of peds and 20 percent clay films on all faces of peds; 1 percent fine distinct strong brown (7.5YR 5/8) and 21 percent medium and coarse distinct yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid; gradual smooth boundary.

2B't—73 to 80 inches; strong brown (7.5YR 5/8) sandy clay loam; weak medium prismatic structure parting to weak fine subangular blocky; firm, very hard; few fine and medium roots; few fine and medium pores; 25 percent dark yellowish brown (10YR 4/4) clay films on all faces of peds; 21 percent medium prominent light brownish gray (10YR 6/2) iron depletions; 21 percent medium and coarse distinct yellowish brown (10YR 5/6) masses of oxidized iron; very strongly acid.

Range in Characteristics

The thickness of the solum is more than 80 inches. Thickness of the ochric epipedon ranges from 18 to 34 inches. The average clay content in the particle-size control section ranges from 10 to 18 percent. Depth to the discontinuity ranges from 45 to 60 inches. A Bt/E, 2Bt/E, or 2Btg/E horizon at least 2 inches thick with more than 15 percent intrusions of albic material is diagnostic for the series.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Where rubbed value is 3, the horizon is less than 7 inches thick. Texture typically is silt loam. Clay content ranges from 2 to 12 percent. The content of rounded ironstone or siliceous pebbles is none or few. The content of iron accumulations in shades of brown is none or few. Reaction ranges from very strongly acid to slightly acid.

The E horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 or 4. Texture is loam, silt loam, very fine sandy loam, or fine sandy loam. The clay content ranges from 2 to 12 percent. The content of iron accumulations in shades of brown and yellow ranges from none to common. The content of rounded ironstone or siliceous pebbles is none or few. Reaction ranges from very strongly acid to moderately acid.

The BE horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 6 to 8. Texture is loam, silt loam, very fine sandy loam, or fine sandy loam. The clay content ranges from 4 to 10 percent. Reaction ranges from extremely acid to moderately acid.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The content of iron accumulations in shades of brown, yellow, or red ranges from none to common. Texture is loam or silt loam. The content of clay depletions in shades of gray ranges from 0 to 5 percent. Texture is silty clay loam in the lower part of the Bt horizon in some pedons. The content of rounded ironstone or siliceous pebbles is none or few. Reaction ranges from extremely acid to strongly acid.

The Bt/E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8 in the Bt part. The E part consists of intrusions of albic material that make up 8 to 35 percent of the volume. The content of iron accumulations in shades of red, brown, or yellow and iron and clay depletions in shades of gray is few or common, or the horizon is variegated in these colors. Texture is loam or silt loam. Texture of silty clay loam may occur in the Bt part below the particle-size control section. The content of rounded ironstone or siliceous pebbles is none or few. Reaction ranges from extremely acid to strongly acid.

The 2Bt/E or 2Btg/E horizon has colors in shades of red, brown, or gray. The content of iron accumulations in shades of red, brown, or yellow and iron and clay depletions in shades of gray ranges from few to many. Texture is clay loam, clay, silty clay, or silty clay loam. The clay content ranges from 30 to 50 percent. Intrusions of albic material make up 15 to 45 percent of the horizon. Reaction is extremely acid or very strongly acid.

The 2Bt horizon, if it occurs, has hue of 10YR to 5YR, value of 4 or 5, and chroma of 6 to 8. The 2Btg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The content of iron accumulations in shades of red, brown, or yellow and iron depletions in shades of gray ranges from few to many, or the horizon is variegated with these colors. Texture is clay loam, clay, silty clay, or silty clay loam. The clay content ranges from 30 to 50 percent. Reaction is extremely acid or very strongly acid.

The 2B't or 2BC horizon, if it occurs, has hue of 5YR to 7.5YR, value of 5 or 6, and chroma of 6 to 8. The horizon has iron accumulations in shades of yellow, brown, or red and iron depletions in shades of gray or olive, or the horizon is variegated with these colors. Texture is silty clay loam, clay loam, loam, or sandy clay loam. The clay content ranges from 20 to 40 percent. Reaction is extremely acid or very strongly acid.

Formation of the Soils

This section relates the factors and processes of soil formation to the soils in Shelby County. It also describes the surface geology of the county.

Factors of Soil Formation

Soil forms through processes acting on geologic material over time. The characteristics of a soil at any given point are determined by the physical and mineral composition of the parent material; the climate under which the parent material accumulated and has existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material. All of these factors are important in the formation of any soil, but the influence of each varies from place to place.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It determines the chemical and mineral composition of the soil. Parent materials in Shelby County consist of unconsolidated, sandy, loamy, and clayey sediments deposited by water during the Eocene, Pleistocene, and Holocene Epochs. The Eocene deposits make up the Wilcox Group, Carrizo Sand, the Reklaw Formation, Queen City Sand, the Weches Formation, and Sparta Sand. The Pleistocene deposits are the sediments on the different fluvial terrace levels in areas along the Sabine and Attoyac Rivers and major streams. The Holocene deposits include the recent alluvial material on the bottomland along the Sabine River, the Attoyac River, and the streams in the county. The soils that formed in these kinds of parent material are identified in the section "Surface Geology."

Climate

A detailed discussion of the climate in Shelby County is given under "General Nature of the County."

Plant and Animal Life

The vegetation under which a soil forms influences soil properties, such as color, structure, reaction, and content and distribution of organic matter. Vegetation extracts water from the soil, recycles nutrients, and adds organic matter to the soil. Gases derived from root respiration combine with water to form acids that influence the weathering of minerals. Because of a lower content of organic matter, soils that formed under forest vegetation are generally lighter in color than those that formed under grasses.

Bacteria, fungi, and many other micro-organisms decompose organic matter and release nutrients to growing plants. They influence the formation of soil structure. Soil properties, such as drainage, temperature, and reaction, influence the type of micro-

organisms that live in the soil. Fungi are generally more active in acid soils, and bacteria are more active in less acid and more alkaline soils.

Earthworms, insects, and small burrowing animals mix the soil and create small channels that aid in soil aeration and water movement. Earthworms help to incorporate crop residue or other organic matter into the soil. The organic matter improves tilth. In areas that are well populated with earthworms, the leaf litter that accumulates on the surface is generally incorporated into the soil by the following spring. If the earthworm population is low, part of the leaf can remain on the surface for several years.

Human activity can significantly influence soil formation. The clearing of native forests followed by continuous farming may drastically change activities within the soil. Cultivation generally accelerates erosion on sloping soils, affects soil structure and compacting, and lowers the content of organic matter. The drainage of wet soils changes soil formation. Fertilizer, lime, and pesticide also affect soil formation. Developing land for urban uses or for mining significantly influences soil development.

Relief

Relief affects soil formation through its influence on drainage, infiltration, and plant cover. It also strongly influences how much water percolates through the soil. Soils on nearly level terraces, such as Guyton soils, have poor drainage. The strongly sloping to steep Cuthbert soils have a thinner solum than the nearby Bowie soils, which are very deep and gently sloping. On the steeper slopes, water runs off faster, less moisture infiltrates into the soil, and plant cover is thinner.

Although most of the soils in Shelby County are gently sloping to steep, the development of shallow soils is not common. The abundant rainfall and long warm periods have overcome most of the effects of relief. Nearly all of the soils in the county are deeply developed.

Time

The length of time that climate, living organisms, and relief act upon the parent material affects the kind of soil that forms. The effects of time are modified by the other four factors of soil formation. In general, however, soils that do not have definite horizons are young or immature. Soils that have well defined horizons are old or mature.

The soils in Shelby county range from young to old. Laneville, Owentown, Iulus, and Dreka soils are on flood plains and have little soil horizon development. Bowie, Cuthbert, and Kirvin soils in the uplands are older soils that have distinct horizon development and have little resemblance to the original parent material.

Processes of Soil Formation

Soil forms through complex processes that are grouped into four general categories. These are additions, removals, transfers, and transformations. These processes affect soil formation in differing degrees and account for the presence of soil layers or horizons.

The accumulation of organic matter in the A horizon is an example of an addition. This accumulation is the main reason for the dark color of the horizon. The color of raw parent material is uniform with increasing depth.

The leaching of lime or bases from the upper few feet is an example of a removal. The parent material of leached soils contains more lime or bases than the soil itself. This indicates leaching of the soil profile by percolating water.

The movement of clay and other material from the A horizon to the B horizon is an

example of a transfer. The E horizon is a zone of maximum eluviation, or loss. The B horizon is a zone of illuviation, or gain. Cuthbert, Lilbert, and many other soils have maximum clay content in the B horizon. An indication of a transfer of clay is thin clay films in pores and on faces of peds.

An example of transformation is the reduction of ferrous iron. This process takes place under wet conditions in which there is no molecular oxygen. Gleying, or the reduction of iron, is evident in Guyton and Mollville soils, which have a dominantly gray subsoil. The gray color indicates the presence of reduced iron, which in turn implies wetness. Reduced iron is soluble, but it commonly has been moved only short distances in the soils in Shelby County, stopping in a lower part of the horizon where it originated or in an underlying horizon. Parts of this iron can be reoxidized and segregated in the form of stains, concretions, or bright yellow and red accumulations.

Surface Geology

Shelby County lies in the western Gulf geomorphic province in which the surface formations dip regionally at very low angles to the Gulf of Mexico. The geology of the survey area is depicted on the Palestine sheet of the geologic map of Texas (15).

Tertiary outcrops, "bedrock formations," are Paleocene (about 65 million years old) to Eocene (about 37 million years old) in age. Quaternary surficial deposits, Pleistocene to Holocene in age, parallel the major streams as terraces and flood plains, respectively. The maximum age of Quaternary deposits is about 2.6 million years old.

The oldest rock in the county is the Wilcox Group of Paleocene-Eocene age. The lower part of the Eocene-age Claiborne Group overlies the Wilcox Group. Claiborne Group formations cropping out in Shelby County, from oldest to youngest, are Carrizo Sand, the Reklaw Formation, Queen City Sand, and a small area of the Weches Formation. The Tertiary formation records a sequence of marine transgression and regression in Shelby County. A transgression results in a decrease in land area and an increase in marine sediment deposition. A regression is a retreat of the sea. A regression results in greater land area and an increase in deltaic and fluvial deposition. Most of the Wilcox Group was deposited under regressive conditions; a partially preserved transgressive stratum is at the top of the group. The lower part of the Reklaw Formation, the Newby Member, is transgressive; the upper part, the Marquez Member, is regressive. The near shore, shallow-water Weches Formation represents the last transgressions.

Most of the county is on the eastern flank of the Sabine Uplift. The uplift has elevated and exposed large areas of the older Wilcox Group and Carrizo Sand as inliers. The western part of the county drains into the Attoyac River and the rest of the county drains easterly into the Toledo Bend Reservoir.

The relationship between Tertiary bedrock formations and Quaternary deposits and their superincumbent soils is complex. Some formations lack definitive or unique lithologies. In some soils, the solum, even C horizon material, may be genetically unrelated to the underlying formations. The uppermost strata in which the soils have developed may be late Tertiary or Quaternary in age and may be of eolian, colluvial, or fluvial origin.

Wilcox Group

The Wilcox Group is not divided into several formations on geologic maps because it occurs elsewhere in east-central Texas.

The Wilcox Group is described as consisting of quartz sands, silt, clays, lignite, and, in some areas, subordinate quantities of glauconite. Glauconite is a fine-grained, greenish, hydroxalated iron and potassium mineral-bearing aluminum silicate.

Glaucanite is an indicator of a marine depositional environment. Consequently, the presence of glauconite at the top of the Wilcox Group is an indication of the Sabinetown Formation stratum. The sands are of fluvial channels and point bar origin; the silts are of fluvial overbank origin. Geologic maps suggests that most of the Wilcox Group in Shelby County belongs to the fluvial overbank facies which encloses a few narrow elongated southwest-trending channel sand deposits. These sediments were laid down by the early Tertiary-age Mount Pleasant Fluvial System flowing from the north and east.

A major part of the outcropped areas of the Wilcox Group in Shelby County is overlain by the Eastwood-Maben-Meth and Metcalf-Eastwood-Latex general soil map units. This area extends to the northwest part of the county. Most of this area is coincident with the distribution of the Wilcox Group outcrop in the south and southwestern parts of the county. The Cuthbert-Tenaha-Darco general soil map unit covers most of the remainder of the remaining Carrizo Sand.

The clayey and shaly parent materials of most soils in the Eastwood-Maben-Meth and Metcalf-Eastwood-Latex general soil map units are flood basin or overbank fluvial in origin. The minor parts of the Wilcox Group outcrop are covered by the Cuthbert-Tenaha-Darco general soil map unit; the sandy parent materials indicate a fluvial channel facies origin.

The Metcalf-Timpson general soil map unit is considered part of the soils on terraces. The relationship of these soils to well defined terraces adjacent to streams is problematical. Perhaps these surface sands were inherited from larger late Tertiary-age, pre-Pleistocene stream channels flowing at higher surface elevations that were obliterated. These sands were possibly distributed downslope by colluvial processes as the topography was lowered by erosion and reworked in part by the wind. The mound-intermound microrelief is indicative of this scenario. Alternatively, soil parent material could have been derived from adjacent sola, especially from the soils of the Tenaha-Lilbert-Darco general soil map unit.

The Metcalf-Sawtown-Latex, Tenaha-Lilbert-Darco, and Eastwood-Maben general soil map units are restricted to the outcrops of the Wilcox Group.

Carrizo Sand

In some places, the Eocene Carrizo Sand unconformably overlies the Wilcox Group. In other places, however, where the Sabinetown Formation is present, the contact is conformable. The Carrizo Sand is described as a fine- to medium-grained, thin-bedded, massive sand. It is fluvial in origin.

The Cuthbert-Tenaha-Darco general soil map unit covers most of the Carrizo Sand outcrop.

Reklaw Formation

The lower part of the Reklaw Formation, the Newby Member, is shallow-water marine or marine shelf in origin and consists of carbonaceous clays and glauconitic sands with marine macrofossils. The upper part is of deltaic and near-shore origin. The Marquez Member is composed mainly of clay and silty clay with thin, locally glauconitic, cross-bedded sand. The scattered areas of the Reklaw Formation outcrops are in the northwest part of the county and on the southwest flank of the domal Sabine Uplift.

Most of the Reklaw Formation outcrops underlie small areas of the Cuthbert-Tenaha-Darco general soil map unit. The soils in this map unit have glauconitic, shaly, and sandy substrates.

Queen City Sand

The Queen City Sand is exposed on the flanks of the Sabine Uplift in the northwestern part of the county. The formation is of tidal embayment, tidal delta, and

barrier island origins. It is mostly sand with minor beds of clay; in some places, it is glauconitic.

In the northwest part of the county, north of Timpson, and the southwest part, mainly west of U.S. Highway 96, the Cuthbert-Tenaha-Darco general soil map unit overlies this formation.

Weches Formation

The Weches Formation consists of marine glauconitic marl, sand, and clay. A very small area is outcropped in the northwestern part of the county, north of Timpson. The soils that typically overlie the Weches Formation are not mapped in this survey area because only a small amount of the formation outcrops in Shelby County. The Cuthbert-Tenaha-Darco general soil map unit and other reddish ironstone-bearing or plinthic soils developed on the Weches Formation.

Pimple Mounds

Pimple mounds are circular to elliptical knolls 10 to 75 feet in diameter and generally less than 3 feet in height. They are known as mima or prairie mounds in areas other than Texas, Louisiana, and contiguous states. In Shelby County, pimple mounds are mapped in the Alazan-Besner, Mollville-Besner, Guyton-Gallime, Bonn-Cart, Metcalf-Sawtown, and Metcalf-Timpson complexes. Besner, Gallime, Sawtown, Cart, and Timpson soils are the mounded soils. The A and E horizons of the soils on mounds generally are thicker than the corresponding horizons of the soils on intermounds. Similar mounds occur in widely scattered areas west of the Mississippi River. They are located mainly on Pleistocene-age sediments or on thin surficial materials that are probably Pleistocene in age. They extend southward along the Gulf Coast into northeastern Texas and adjacent Louisiana and northward into southeastern Oklahoma, Arkansas, and southern Missouri. The mounds occur in isolated areas in northwestern Iowa, in northwestern Minnesota, and in parts of New Mexico, Colorado, and Wyoming. In the western states, they occur in parts of Washington, Idaho, and California.

There are numerous and diverse theories of the origin of pimple mounds. Hypotheses for the genesis of pimple mounds along the Gulf Coast and in northeast Texas are:

- (1) Residual hillocks remained after wind erosion, sheet flood erosion (possibly with a core of tress-root bonded surficial material), or fluvial erosion.
- (2) Wind-transported sand, silt, or clay pellets or chips around clumps of vegetation accumulated.
- (3) Tree-tip mounds or cradle knolls accumulated or were modified.
- (4) Sites of eolian accumulations were stated by, or topographically enhanced by, erosional processes.
- (5) Pimple mounds resulted from the “fluffing up,” or the decreasing of the bulk densities, of solum materials and the lateral or centripetal transport of surface materials by burrowing animals, such as pocket gophers, with possible eolian increments.

Hypotheses 4 and 5, which involve eolian effects, seem the most plausible causes for the Gulf Coast and northeast Texas mounds. Eolian accumulation suggests a partly non-pedogenic origin for the thickened A and E horizons and perhaps drier climates.

Holocene Alluvium

The term “Holocene” has been defined as covering the past 10,000 years. Locally, this is the time of floodplain sediment deposition along streams. These streams include the Attoyac River and its tributaries on the west, Flat Fork Creek in the north-central part of the county, Huana Creek, and Tenaha Creek in the south-central part of the county; and the Sabine River, which marks the northeastern county line.

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Most floodplain sediments are the parent materials of the soils in the Laneville-Dreka general soil map unit.

All floodplain soils having minor profile development are Entisols or Inceptisols. Most floodplain soils are considered to be frequently or occasionally flooded for brief to long periods.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Aspect. The direction in which a slope faces.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is

saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

- Chemical treatment.** Control of unwanted vegetation through the use of chemicals.
- Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.
- Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.
- Clay depletions.** Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.
- Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.
- Claypan.** A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.
- Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.
- Coarse textured soil.** Sand or loamy sand.
- Cobble (or cobblestone).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.
- Cobbly soil material.** Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.
- COLE (coefficient of linear extensibility).** See Linear extensibility.
- Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.
- Complex slope.** Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.
- Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.
- Concretions.** Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.
- Conglomerate.** A coarse-grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.
- Conservation cropping system.** Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.
- Conservation tillage.** A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.
- Consistence, soil.** Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of

soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep soils, 20 to 40 inches; shallow soils, 10 to 20 inches; and very shallow soils, less than 10 inches.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a

consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained*, *somewhat excessively drained*, *well drained*, *moderately well drained*, *somewhat poorly drained*, *poorly drained*, and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable

according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or

angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Head out. To form a flower head.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that

in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential.

The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state.

Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all.

No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements.

Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine-grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

- Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.
- Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.
- Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.
- Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.
- Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.
- Mottling, soil.** Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).
- Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.
- Muck.** Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)
- Mudstone.** Sedimentary rock formed by induration of silt and clay in approximately equal amounts.
- Munsell notation.** A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.
- Natric horizon.** A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.
- Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)
- Nodules.** Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.
- Nose slope.** A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.
- Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.
- Organic matter.** Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher-lying areas of the erosion surface.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse-grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically

reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a

hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 1 percent
Very gently sloping	1 to 3 percent
Gently sloping	3 to 5 percent
Moderately sloping	5 to 8 percent
Strongly sloping	8 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 45 percent
Very steep	45 percent and higher

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is

expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Severe	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

- Subsoiling.** Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.
- Substratum.** The part of the soil below the solum.
- Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.
- Summer fallow.** The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.
- Summit.** The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.
- Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”
- Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.
- Talus.** Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.
- Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.
- Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.
- Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”
- Thin layer** (in tables). Otherwise suitable soil material that is too thin for the specified use.
- Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.
- Toeslope.** The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.
- Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.
- Trace elements.** Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.
- Upland.** Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.
- Variegation.** Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.
- Water bars.** Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.
- Weathering.** All physical and chemical changes produced in rocks or other deposits at

or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse-grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Soil Survey of Shelby County, Texas

Table 1.--Temperature and Precipitation
(Recorded in the period 1971-2000 at Center, Texas)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snow- fall
				Maximum temp. higher than--	Minimum temp. lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
January--	57.0	34.0	45.5	79	13	76	5.04	2.08	7.67	7	0.9
February--	62.4	37.2	49.8	83	17	118	4.13	1.82	6.36	6	0.1
March----	69.6	43.7	56.6	86	23	246	4.27	2.56	6.00	6	0.0
April----	76.4	50.6	63.5	89	32	409	4.41	1.72	6.60	5	0.0
May-----	83.3	60.0	71.6	93	43	670	5.04	2.26	7.92	6	0.0
June-----	89.7	67.1	78.4	98	52	847	4.81	2.19	7.01	6	0.0
July-----	93.9	70.6	82.2	103	61	999	3.04	1.30	4.52	5	0.0
August---	93.8	69.0	81.4	104	57	972	3.76	1.14	6.21	5	0.0
September	88.2	62.9	75.6	101	43	767	4.20	1.86	6.04	5	0.0
October--	78.8	51.3	65.0	93	32	470	4.64	1.82	6.84	5	0.0
November-	67.8	42.2	55.0	86	22	208	4.68	2.56	6.74	6	0.1
December-	59.8	35.6	47.7	80	14	97	5.05	2.85	7.24	6	0.1
Yearly: Average	76.7	52.0	64.4	---	---	---	---	---	---	---	---
Extreme	112	2	---	105	10	---	---	---	---	---	---
Total--	---	---	---	---	---	5,879	53.07	43.92	61.51	68	1.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Soil Survey of Shelby County, Texas

Table 2.—Freeze Dates in Spring and Fall
(Recorded in the period 1971-2000 at Center, Texas)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 11	Mar. 26	Apr. 7
2 years in 10 later than--	Mar. 28	Mar. 17	Apr. 1
5 years in 10 later than--	Feb. 5	Mar. 1	Mar. 19
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 14	Nov. 2	Oct. 22
2 years in 10 earlier than--	Nov. 23	Nov. 10	Oct. 28
5 years in 10 earlier than--	Dec. 9	Nov. 23	Nov. 9

Table 3.—Growing Season
(Recorded in the period 1971-2000 at Center, Texas)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	261	232	206
8 years in 10	277	243	216
5 years in 10	306	266	234
2 years in 10	335	289	252
1 year in 10	351	301	261

Soil Survey of Shelby County, Texas

Table 4.—Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AbA	Alazan-Besner complex, 0 to 1 percent slopes, mounded-----	7,549	1.4
AtB	Attoyac fine sandy loam, 0 to 5 percent slopes-----	543	0.1
AuD	Austonio fine sandy loam, 5 to 12 percent slopes-----	3,006	0.6
BaB	Bernaldo fine sandy loam, 0 to 3 percent slopes-----	2,764	0.5
BeA	Besner fine sandy loam, 0 to 3 percent slopes-----	1,518	0.3
BfC	Betis loamy fine sand, 0 to 8 percent slopes-----	9,112	1.7
BnA	Bonn-Cart complex, 0 to 2 percent slopes, mounded-----	460	*
BwB	Bowie fine sandy loam, 1 to 5 percent slopes-----	5,125	1.0
ChE	Cuthbert fine sandy loam, 5 to 15 percent slopes-----	17,882	3.3
CgE	Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes-----	3,071	0.6
CrG	Cuthbert soils, 5 to 15 percent slopes, graded-----	216	*
CsG	Cuthbert fine sandy loam, 5 to 35 percent slopes, stony-----	373	*
CtG	Cuthbert fine sandy loam, 15 to 35 percent slopes-----	1,483	0.3
DaC	Darco loamy fine sand, 1 to 8 percent slopes-----	7,088	1.3
DaE	Darco loamy fine sand, 8 to 15 percent slopes-----	7,448	1.4
Dr	Dreka loam, 0 to 1 percent slopes, frequently flooded-----	24,335	4.6
EeB	Eastwood very fine sandy loam, 1 to 5 percent slopes-----	53,049	9.9
EeD	Eastwood very fine sandy loam, 5 to 15 percent slopes-----	55,620	10.4
ElA	Eastwood-Latex complex, 1 to 3 percent slopes, mounded-----	4,436	0.8
GaA	Gallime-Guyton complex, 0 to 2 percent slopes, mounded-----	2,212	0.4
GaB	Gallime very fine sandy loam, 1 to 3 percent slopes-----	1,686	0.3
GrB	Grapeland loamy fine sand, 1 to 5 percent slopes-----	1,325	0.2
GtA	Guyton silt loam, ponded-----	360	*
HaB	Hainesville fine sand, 0 to 2 percent slopes-----	742	0.1
Iu	Iulus soils, frequently flooded-----	1,662	0.3
KfC	Kirvin fine sandy loam, 1 to 5 percent slopes-----	4,766	0.9
KgC	Kirvin gravelly fine sandy loam, 1 to 5 percent slopes-----	1,925	0.4
KsC	Kirvin soils, 1 to 5 percent slopes, graded-----	607	0.1
La	Laneville silt loam, occasionally flooded-----	9,210	1.7
Lf	Laneville loam, 0 to 1 percent slopes, frequently flooded-----	45,520	8.5
LtB	Latex fine sandy loam, 1 to 3 percent slopes-----	22,099	4.1
LuC	Lilbert loamy fine sand, 1 to 5 percent slopes-----	11,813	2.2
MaE	Maben fine sandy loam, 5 to 15 percent slopes-----	57,673	10.8
MaG	Maben fine sandy loam, 15 to 35 percent slopes-----	1,935	0.4
McA	Metcalfe very fine sandy loam, 0 to 2 percent slopes-----	21,272	4.0
MeA	Metcalfe-Sawtown complex, 0 to 2 percent slopes, mounded-----	47,532	8.9
MfA	Metcalfe-Timpson complex, 0 to 2 percent slopes, mounded-----	13,853	2.6
MhC	Meth fine sandy loam, 1 to 5 percent slopes-----	18,295	3.4
MpA	Mollville-Besner complex, 0 to 3 percent slopes, mounded-----	5,243	1.0
Ow	Owentown fine sandy loam, 0 to 1 percent slopes, occasionally flooded---	7,095	1.3
Ox	Owentown fine sandy loam, 0 to 1 percent slopes, frequently flooded---	486	*
RnB	Rentzel loamy fine sand, 0 to 5 percent slopes-----	1,474	0.3
SaC	Sacul fine sandy loam, 1 to 5 percent slopes-----	3,955	0.7
SfA	Sawtown very fine sandy loam, 0 to 2 percent slopes-----	8,561	1.6
TnB	Tenaha loamy fine sand, 1 to 5 percent slopes-----	4,292	0.8
TnD	Tenaha loamy fine sand, 5 to 15 percent slopes-----	11,394	2.1
TnG	Tenaha loamy fine sand, 15 to 35 percent slopes-----	427	*
W	Water-----	21,684	4.1
	Total-----	534,176	100.0

* Less than 0.1 percent.

Soil Survey of Shelby County, Texas

Table 5.—Land Capability and Yields per Acre of Pasture

(Yields are those that can be expected under a high level of management.
They are for nonirrigated areas. Absence of a yield indicates that the
soil is not suited to the crop or the crop generally is not grown on
the soil)

Map symbol and soil name	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		<u>AUM</u>	<u>AUM</u>	<u>AUM</u>
AbA:				
Alazan-----	2w	6.00	5.00	7.00
Besner-----	2e	7.00	---	9.00
AtB:				
Attoyac-----	3e	7.00	6.00	10.00
AuD:				
Austonio-----	4e	7.00	6.00	8.00
BaB:				
Bernaldo-----	2e	8.00	7.00	10.00
BeA:				
Besner-----	2e	7.00	---	9.00
BfC:				
Betis-----	3s	---	---	3.00
BnA:				
Bonn-----	4s	---	4.00	---
Cart-----	2e	8.00	7.00	10.00
BwB:				
Bowie-----	3e	6.00	5.00	7.00
CbE:				
Cuthbert-----	6e	2.00	2.00	3.00
CgE:				
Cuthbert-----	6e	2.00	1.00	2.00
CrG:				
Cuthbert-----	6e	---	1.00	2.00
CsG:				
Cuthbert-----	7s	---	---	---
CtG:				
Cuthbert-----	7e	---	---	---
DaC:				
Darco-----	3s	---	---	3.00
DaE:				
Darco-----	6e	---	---	2.00
Dr:				
Dreka-----	5w	2.00	2.00	2.00
EeB:				
Eastwood-----	4e	6.00	6.00	7.50

Soil Survey of Shelby County, Texas

Table 5.—Land Capability and Yields per Acre of Pasture—Continued

Map symbol and soil name	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		<u>AUM</u>	<u>AUM</u>	<u>AUM</u>
EeD: Eastwood-----	6e	5.50	5.50	6.50
ElA: Eastwood-----	3e	5.50	5.50	6.50
Latex-----	2e	8.00	7.00	10.00
GaA: Gallime-----	2e	8.00	7.00	9.00
Guyton-----	3w	6.50	5.00	---
GaB: Gallime-----	2e	8.00	7.00	9.00
GrB: Grapeland-----	3s	---	---	6.00
GtA: Guyton-----	7w	---	---	---
HaB: Hainesville-----	3s	---	---	7.50
Iu: Iulus-----	5w	7.00	6.00	8.00
KfC: Kirvin-----	3e	4.00	3.00	5.00
KgC: Kirvin-----	4e	3.00	2.00	4.00
KsC: Kirvin-----	3e	4.00	3.00	5.00
La: Laneville-----	2w	7.00	7.00	9.00
Lf: Laneville-----	5w	6.00	6.00	8.00
LtB: Latex-----	2e	8.00	7.00	10.00
LuC: Lilbert-----	3e	3.00	---	4.00
MaE: Maben-----	4e	7.00	---	7.00
MaG: Maben-----	7e	---	---	---
McA: Metcalf-----	2w	7.00	5.00	11.00

Soil Survey of Shelby County, Texas

Table 5.—Land Capability and Yields per Acre of Pasture—Continued

Map symbol and soil name	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		<u>AUM</u>	<u>AUM</u>	<u>AUM</u>
MeA:				
Metcalf-----	2w	7.00	5.00	11.00
Sawtown-----	2e	7.00	6.00	9.00
MfA:				
Metcalf-----	2w	7.00	5.00	11.00
Timpson-----	2w	7.00	6.00	9.00
MhC:				
Meth-----	3e	7.00	5.00	12.00
MpA:				
Mollville-----	4w	4.00	4.00	---
Besner-----	2e	7.00	---	9.00
Ow:				
Owentown-----	2w	9.00	7.00	8.00
Ox:				
Owentown-----	5w	9.00	7.00	8.00
RnB:				
Rentzel-----	3w	4.00	3.00	4.00
SaC:				
Sacul-----	4e	7.50	6.50	7.50
SfA:				
Sawtown-----	2e	7.00	6.00	9.00
TnB:				
Tenaha-----	3e	2.00	2.00	3.00
TnD:				
Tenaha-----	6e	2.00	2.00	3.00
TnG:				
Tenaha-----	7e	2.00	2.00	3.00
W. Water				

Soil Survey of Shelby County, Texas

Table 6.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Map unit name
AbA	Alazan-Besner complex, 0 to 1 percent slopes, mounded
AtB	Attoyac fine sandy loam, 0 to 5 percent slopes
BaB	Bernaldo fine sandy loam, 0 to 3 percent slopes
BeA	Besner fine sandy loam, 0 to 3 percent slopes
BnA	Bonn-Cart complex, 0 to 2 percent slopes, mounded (if drained)
BwB	Bowie fine sandy loam, 1 to 5 percent slopes
GaA	Gallime-Guyton complex, 0 to 2 percent slopes, mounded (if drained)
GaB	Gallime very fine sandy loam, 1 to 3 percent slopes
La	Laneville silt loam, occasionally flooded
LtB	Latex fine sandy loam, 1 to 3 percent slopes
McA	Metcalf very fine sandy loam, 0 to 2 percent slopes
MeA	Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded
MfA	Metcalf-Timpson complex, 0 to 2 percent slopes, mounded
MhC	Meth fine sandy loam, 1 to 5 percent slopes
MpA	Mollville-Besner complex, 0 to 3 percent slopes, mounded (if drained)
Ow	Owentown fine sandy loam, 0 to 1 percent slopes, occasionally flooded
Ox	Owentown fine sandy loam, 0 to 1 percent slopes, frequently flooded (if protected from flooding or not frequently flooded during the growing season)
SfA	Sawtown very fine sandy loam, 0 to 2 percent slopes

Soil Survey of Shelby County, Texas

Table 7.—Hydric Soils

(Only those map unit components that are rated as hydric are listed)

Map symbol and map unit name	Major component or inclusion	Percent of map unit	Landform	Hydric rating	Hydric criteria
AbA: Alazan-Besner complex, 0 to 1 percent slopes, mounded	Guyton	10	Depressions, stream terraces	Yes	2B3
BaB: Bernaldo fine sandy loam, 0 to 3 percent slopes	Guyton	5	Depressions, stream terraces	Yes	2B3
BeA: Besner fine sandy loam, 0 to 3 percent slopes	Mollville	15	Depressions	Yes	2B3
BnA: Bonn-Cart complex, 0 to 2 percent slopes, mounded	Bonn	60	Stream terraces	Yes	2B3
Dr: Dreka loam, 0 to 1 percent slopes, frequently flooded	Dreka	80	Flood plains	Yes	4
GaA: Gallime-Guyton complex, 0 to 2 percent slopes, mounded	Guyton	42	Depressions, stream terraces	Yes	2B3
GaB: Gallime very fine sandy loam, 0 to 3 percent slopes	Guyton	10	Depressions, stream terraces	Yes	2B3
GtA: Guyton silt loam, ponded	Guyton	90	Stream terraces	Yes	2B3, 3, 4
Iu: Iulus soils, frequently flooded	Mattex	10	Flood plains	Yes	4
La: Laneville silt loam, occasionally flooded	Dreka	15	Flood plains	Yes	4
Lf: Laneville loam, 0 to 1 percent slopes, frequently flooded	Dreka	10	Flood plains	Yes	4
McA: Metcalf very fine sandy loam, 0 to 2 percent slopes	Guyton	10	Depressions, stream terraces	Yes	2B3
MeA: Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded	Wrightsville	10	Depressions	Yes	2B3
MfA: Metcalf-Timpson complex, 0 to 2 percent slopes, mounded	Guyton	10	Depressions, stream terraces	Yes	2B3
MpA: Mollville-Besner complex, 0 to 3 percent slopes, mounded	Mollville	60	Stream terraces	Yes	2B3, 3

Soil Survey of Shelby County, Texas

Table 7.—Hydric Soils—Continued

Map symbol and map unit name	Major component or inclusion	Percent of map unit	Landform	Hydric rating	Hydric criteria
Ow: Owentown fine sandy loam, 0 to 1 percent slopes, occasionally flooded	Bibb	15	Flood plains	Yes	4
Ox: Owentown fine sandy loam, 0 to 1 percent slopes, frequently flooded	Bibb	5	Flood plains	Yes	4
RnB: Rentzel loamy fine sand, 0 to 5 percent slopes	Bibb	10	Flood plains	Yes	4
SfA: Sawtown very fine sandy loam, 0 to 2 percent slopes	Guyton	10	Depressions, stream terraces	Yes	2B3

Soil Survey of Shelby County, Texas

Table 8.—Forestland Productivity

(Absence of an entry indicates that information was not available)

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
AbA:				
Alazan-----	loblolly pine-----	95	380	loblolly pine, slash pine, sweetgum
	shortleaf pine-----	---	---	
	southern red oak----	---	---	
	sweetgum-----	---	---	
Besner-----	loblolly pine-----	93	380	loblolly pine, slash pine, sweetgum
	shortleaf pine-----	85	380	
	southern red oak----	---	---	
	sweetgum-----	---	---	
AtB:				
Attoyac-----	loblolly pine-----	95	380	loblolly pine
	shortleaf pine-----	87	380	
AuD:				
Austonio-----	loblolly pine-----	88	340	loblolly pine
	shortleaf pine-----	84	380	
	southern red oak----	---	---	
	sweetgum-----	---	---	
BaB:				
Bernaldo-----	loblolly pine-----	94	380	loblolly pine, sweetgum
	shortleaf pine-----	84	380	
	southern red oak----	---	---	
	sweetgum-----	---	---	
BeA:				
Besner-----	loblolly pine-----	93	380	loblolly pine, slash pine, sweetgum
	shortleaf pine-----	85	380	
	southern red oak----	---	---	
	sweetgum-----	---	---	
BfC:				
Betis-----	loblolly pine-----	83	300	loblolly pine
	shortleaf pine-----	80	340	
BnA:				
Bonn-----	post oak-----	55	---	sweetgum
	sweetgum-----	---	---	
	water oak-----	---	---	
Cart-----	loblolly pine-----	102	420	loblolly pine
	shortleaf pine-----	87	380	
	slash pine-----	102	230	
	southern red oak----	90	190	
	sweetgum-----	100	380	
BwB:				
Bowie-----	loblolly pine-----	86	340	loblolly pine
	shortleaf pine-----	80	340	
ChE:				
Cuthbert-----	loblolly pine-----	84	300	loblolly pine
	shortleaf pine-----	72	300	

See footnote at end of table.

Soil Survey of Shelby County, Texas

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
CgE:				
Cuthbert-----	loblolly pine-----	84	300	loblolly pine
	shortleaf pine-----	72	300	
CrG:				
Cuthbert-----	loblolly pine-----	60	190	loblolly pine
	shortleaf pine-----	---	---	
CsG:				
Cuthbert-----	loblolly pine-----	76	270	loblolly pine, shortleaf pine
	shortleaf pine-----	68	270	
CtG:				
Cuthbert-----	loblolly pine-----	80	300	loblolly pine
	shortleaf pine-----	75	300	
DaC:				
Darco-----	loblolly pine-----	81	300	loblolly pine, shortleaf pine
	shortleaf pine-----	76	300	
DaE:				
Darco-----	loblolly pine-----	81	300	loblolly pine, shortleaf pine
	shortleaf pine-----	76	300	
Dr:				
Dreka-----	sweetgum-----	93	300	sweetgum, water oak
	water oak-----	90	230	
	willow oak-----	90	230	
EeB:				
Eastwood-----	hickory-----	---	---	loblolly pine
	loblolly pine-----	93	380	
	shortleaf pine-----	---	---	
	southern red oak----	---	---	
	sweetgum-----	---	---	
EeD:				
Eastwood-----	hickory-----	---	---	loblolly pine
	loblolly pine-----	93	340	
	shortleaf pine-----	77	340	
	southern red oak----	---	---	
	sweetgum-----	---	---	
E1A:				
Eastwood-----	hickory-----	---	---	loblolly pine
	loblolly pine-----	93	340	
	shortleaf pine-----	77	340	
	southern red oak----	---	---	
	sweetgum-----	---	---	
Latex-----	hickory-----	---	---	loblolly pine
	loblolly pine-----	91	340	
	shortleaf pine-----	86	380	
	slash pine-----	100	230	
	southern red oak----	95	190	
	sweetgum-----	95	300	

See footnote at end of table.

Soil Survey of Shelby County, Texas

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
GaA:				
Gallime-----	loblolly pine-----	90	340	loblolly pine, sweetgum
	shortleaf pine-----	80	340	
	southern red oak----	---	---	
	sweetgum-----	---	---	
Guyton-----	cherrybark oak-----	---	---	green ash, loblolly pine, slash pine, water oak
	green ash-----	---	---	
	loblolly pine-----	85	300	
	slash pine-----	90	420	
	sweetgum-----	---	---	
	water oak-----	---	---	
	willow oak-----	78	190	
GaB:				
Gallime-----	loblolly pine-----	90	340	loblolly pine, sweetgum
	shortleaf pine-----	80	340	
	southern red oak----	---	---	
	sweetgum-----	---	---	
GrB:				
Grapeland-----	loblolly pine-----	80	300	---
GtA:				
Guyton-----	cherrybark oak-----	---	---	green ash, loblolly pine, slash pine, water oak
	green ash-----	---	---	
	loblolly pine-----	85	300	
	slash pine-----	90	420	
	sweetgum-----	---	---	
	water oak-----	---	---	
	willow oak-----	78	190	
HaB:				
Hainesville-----	loblolly pine-----	96	380	loblolly pine, shortleaf pine
	shortleaf pine-----	88	380	
Iu:				
Iulus-----	sweetgum-----	100	380	loblolly pine, sweetgum
	water oak-----	100	270	
KfC:				
Kirvin-----	loblolly pine-----	85	300	loblolly pine, slash pine
	shortleaf pine-----	75	300	
KgC:				
Kirvin-----	loblolly pine-----	85	300	loblolly pine, slash pine
	shortleaf pine-----	75	300	
KsC:				
Kirvin-----	loblolly pine-----	85	300	loblolly pine, slash pine
	shortleaf pine-----	75	300	
La:				
Laneville-----	loblolly pine-----	100	420	loblolly pine
	sweetgum-----	100	380	
	water oak-----	100	270	

See footnote at end of table.

Soil Survey of Shelby County, Texas

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
Lf:				
Laneville-----	loblolly pine-----	100	420	loblolly pine
	sweetgum-----	100	380	
	water oak-----	100	270	
LtB:				
Latex-----	hickory-----	---	---	loblolly pine
	loblolly pine-----	91	340	
	shortleaf pine-----	86	380	
	slash pine-----	100	230	
	southern red oak----	95	190	
	sweetgum-----	95	300	
LuC:				
Lilbert-----	loblolly pine-----	88	340	loblolly pine, slash pine
	longleaf pine-----	70	230	
	shortleaf pine-----	74	300	
	southern red oak----	---	---	
	sweetgum-----	---	---	
MaE:				
Maben-----	loblolly pine-----	83	300	loblolly pine, shortleaf pine
	shortleaf pine-----	73	300	
MaG:				
Maben-----	loblolly pine-----	83	300	loblolly pine, shortleaf pine
	shortleaf pine-----	73	300	
McA:				
Metcalf-----	loblolly pine-----	92	380	cherrybark oak, loblolly pine, shortleaf pine, Shumard's oak
	shortleaf pine-----	74	300	
	southern red oak----	---	---	
	sweetgum-----	---	---	
	white oak-----	---	---	
MeA:				
Metcalf-----	loblolly pine-----	92	380	cherrybark oak, loblolly pine, shortleaf pine, Shumard's oak
	shortleaf pine-----	74	300	
	southern red oak----	---	---	
	sweetgum-----	---	---	
	white oak-----	---	---	
Sawtown-----	loblolly pine-----	90	340	loblolly pine, slash pine
	shortleaf pine-----	80	340	
MfA:				
Metcalf-----	loblolly pine-----	92	380	cherrybark oak, loblolly pine, shortleaf pine, Shumard's oak
	shortleaf pine-----	74	300	
	southern red oak----	---	---	
	sweetgum-----	---	---	
	white oak-----	---	---	
Timpson-----	loblolly pine-----	90	270	loblolly pine
	shortleaf pine-----	95	190	
	sweetgum-----	75	230	

See footnote at end of table.

Soil Survey of Shelby County, Texas

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
MhC:				
Meth-----	hickory-----	---	---	loblolly pine, southern red oak, white oak
	loblolly pine-----	80	300	
	shortleaf pine-----	74	300	
	southern red oak-----	---	---	
	sweetgum-----	---	---	
	white oak-----	---	---	
MpA:				
Mollville-----	loblolly pine-----	82	300	loblolly pine, sweetgum, water oak
	sweetgum-----	80	230	
	water oak-----	80	190	
	willow oak-----	80	190	
Besner-----	loblolly pine-----	93	380	loblolly pine, slash pine, sweetgum
	shortleaf pine-----	85	380	
	southern red oak-----	---	---	
	sweetgum-----	---	---	
Ow:				
Owentown-----	blackgum-----	---	---	black walnut, loblolly pine, pecan, southern red oak, sweetgum
	loblolly pine-----	100	420	
	southern red oak-----	---	---	
	sweetgum-----	---	---	
	white oak-----	---	---	
Ox:				
Owentown-----	blackgum-----	---	---	black walnut, loblolly pine, pecan, southern red oak, sweetgum
	loblolly pine-----	100	420	
	southern red oak-----	---	---	
	sweetgum-----	---	---	
	white oak-----	---	---	
RnB:				
Rentzel-----	loblolly pine-----	89	340	loblolly pine
	shortleaf pine-----	76	300	
	sweetgum-----	---	---	
SaC:				
Sacul-----	loblolly pine-----	90	230	loblolly pine, shortleaf pine
	shortleaf pine-----	80	271	
SfA:				
Sawtown-----	loblolly pine-----	90	340	loblolly pine, slash pine
	shortleaf pine-----	80	340	
TnB:				
Tenaha-----	loblolly pine-----	87	340	loblolly pine
	shortleaf pine-----	77	340	
TnD:				
Tenaha-----	loblolly pine-----	87	340	loblolly pine
	shortleaf pine-----	77	340	

Soil Survey of Shelby County, Texas

Table 8.—Forestland Productivity—Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber*	
TnG:				
Tenaha-----	loblolly pine-----	87	340	loblolly pine
	shortleaf pine-----	77	340	
W.				
Water				

* Volume is the yield in board feet (Doyle Rule) per acre per year calculated at the age of 50 years for fully stocked natural stands.

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA:							
Alazan-----	50	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Besner-----	40	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
AtB:							
Attoyac-----	95	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
AuD:							
Austonio-----	85	Moderate Low strength	0.50	Moderately suited Low strength Slope	0.50 0.50	Severe Low strength	1.00
BaB:							
Bernaldo-----	90	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
BeA:							
Besner-----	70	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
BfC:							
Betis-----	95	Slight		Well suited		Moderate Low strength	0.50
BnA:							
Bonn-----	60	Moderate Low strength	0.50	Poorly suited Wetness Low strength	1.00 0.50	Severe Low strength	1.00
Cart-----	40	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
BwB:							
Bowie-----	80	Slight		Well suited		Moderate Low strength	0.50
CbE:							
Cuthbert-----	80	Moderate Low strength	0.50	Moderately suited Slope Low strength	0.50 0.50	Severe Low strength	1.00
CgE:							
Cuthbert-----	90	Moderate Low strength	0.50	Moderately suited Slope	0.50	Moderate Low strength	0.50
CrG:							
Cuthbert-----	80	Moderate Low strength	0.50	Moderately suited Slope Low strength	0.50 0.50	Severe Low strength	1.00

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part I—Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CsG: Cuthbert-----	90	Moderate Slope	0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
CtG: Cuthbert-----	80	Moderate Slope	0.50	Poorly suited Slope Low strength	1.00 0.50	Severe Low strength	1.00
DaC: Darco-----	95	Slight		Well suited		Moderate Low strength	0.50
DaE: Darco-----	90	Slight		Moderately suited Slope	0.50	Moderate Low strength	0.50
Dr: Dreka-----	80	Severe Flooding Low strength	1.00 0.50	Poorly suited Flooding Wetness Low strength	1.00 0.50 0.50	Severe Low strength	1.00
EeB: Eastwood-----	90	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
EeD: Eastwood-----	95	Moderate Low strength	0.50	Moderately suited Slope Low strength	0.50 0.50	Severe Low strength	1.00
ElA: Eastwood-----	50	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Latex-----	40	Moderate Low strength Stickiness/slope	0.50 0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
GaA: Gallime-----	48	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Guyton-----	42	Moderate Low strength	0.50	Poorly suited Wetness Low strength	1.00 0.50	Severe Low strength	1.00
GaB: Gallime-----	90	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
GrB: Grapeland-----	85	Slight		Well suited		Moderate Low strength	0.50

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part I—Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GtA: Guyton-----	90	Severe Flooding Wetness Low strength	 1.00 1.00 0.50	Poorly suited Ponding Flooding Wetness Low strength	 1.00 1.00 1.00 0.50	Severe Low strength Wetness	 1.00 0.50
HaB: Hainesville-----	90	Slight		Well suited		Moderate Low strength	0.50
Iu: Iulus-----	80	Severe Flooding	1.00	Poorly suited Flooding Low strength	1.00 0.50	Severe Low strength	1.00
KfC: Kirvin-----	95	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
KgC: Kirvin-----	90	Slight		Well suited		Moderate Low strength	0.50
KsC: Kirvin-----	95	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
La: Laneville-----	85	Severe Flooding Low strength	1.00 0.50	Poorly suited Flooding Low strength	1.00 0.50	Severe Low strength	1.00
Lf: Laneville-----	80	Severe Flooding Low strength	1.00 0.50	Poorly suited Flooding Low strength	1.00 0.50	Severe Low strength	1.00
LtB: Latex-----	70	Moderate Low strength Stickiness/slope	0.50 0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
LuC: Lilbert-----	90	Slight		Well suited		Moderate Low strength	0.50
MaE: Maben-----	90	Moderate Low strength	0.50	Moderately suited Slope	0.50	Moderate Low strength	0.50
MaG: Maben-----	90	Moderate Slope	0.50	Poorly suited Slope	1.00	Moderate Low strength	0.50
McA: Metcalf-----	80	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00

Soil Survey of Shelby County, Texas

Table 9.--Forest Management, Part I--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MeA:							
Metcalf-----	45	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Sawtown-----	35	Slight		Well suited		Moderate Low strength	0.50
MfA:							
Metcalf-----	55	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Timpson-----	35	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
MhC:							
Meth-----	80	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
MpA:							
Mollville-----	60	Moderate Low strength	0.50	Poorly suited Ponding Wetness Low strength	1.00 1.00 0.50	Severe Low strength	1.00
Besner-----	35	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
Ow:							
Owentown-----	85	Severe Flooding	1.00	Poorly suited Flooding	1.00	Moderate Low strength	0.50
Ox:							
Owentown-----	90	Severe Flooding	1.00	Poorly suited Flooding	1.00	Moderate Low strength	0.50
RnB:							
Rentzel-----	70	Slight		Well suited		Moderate Low strength	0.50
SaC:							
Sacul-----	90	Slight		Well suited		Moderate Low strength	0.50
SfA:							
Sawtown-----	80	Moderate Low strength	0.50	Moderately suited Low strength	0.50	Severe Low strength	1.00
TnB:							
Tenaha-----	80	Slight		Well suited		Moderate Low strength	0.50
TnD:							
Tenaha-----	80	Slight		Moderately suited Slope	0.50	Moderate Low strength	0.50
TnG:							
Tenaha-----	80	Moderate Slope	0.50	Poorly suited Slope	1.00	Moderate Low strength	0.50
W:							
Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Slight		Slight		Moderately suited Low strength	0.50
Besner-----	40	Slight		Slight		Moderately suited Low strength	0.50
AtB: Attoyac-----	95	Slight		Slight		Moderately suited Low strength	0.50
AuD: Austonio-----	85	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
BaB: Bernaldo-----	90	Slight		Slight		Moderately suited Low strength	0.50
BeA: Besner-----	70	Slight		Slight		Moderately suited Low strength	0.50
BfC: Betis-----	95	Slight		Slight		Well suited	
BnA: Bonn-----	60	Slight		Slight		Poorly suited Wetness Low strength	1.00 0.50
Cart-----	40	Slight		Slight		Moderately suited Low strength	0.50
BwB: Bowie-----	80	Slight		Moderate Slope/erodibility	0.50	Well suited	
CbE: Cuthbert-----	80	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
CgE: Cuthbert-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
CrG: Cuthbert-----	80	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part II—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CsG: Cuthbert-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
CtG: Cuthbert-----	80	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
DaC: Darco-----	95	Slight		Moderate Slope/erodibility	0.50	Well suited	
DaE: Darco-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
Dr: Dreka-----	80	Slight		Slight		Poorly suited Flooding Wetness Low strength	1.00 0.50 0.50
EeB: Eastwood-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
EeD: Eastwood-----	95	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
ElA: Eastwood-----	50	Slight		Slight		Moderately suited Low strength	0.50
Latex-----	40	Slight		Slight		Moderately suited Low strength	0.50
GaA: Gallime-----	48	Slight		Slight		Moderately suited Low strength	0.50
Guyton-----	42	Slight		Slight		Poorly suited Wetness Low strength	1.00 0.50
GaB: Gallime-----	90	Slight		Slight		Moderately suited Low strength	0.50
GrB: Grapeland-----	85	Slight		Slight		Well suited	
GtA: Guyton-----	90	Slight		Slight		Poorly suited Ponding Flooding Wetness Low strength	1.00 1.00 1.00 0.50

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part II—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HaB: Hainesville-----	90	Slight		Slight		Well suited	
Iu: Iulus-----	80	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
KfC: Kirvin-----	95	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
KgC: Kirvin-----	90	Slight		Slight		Well suited	
KsC: Kirvin-----	95	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
La: Laneville-----	85	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
Lf: Laneville-----	80	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
LtB: Latex-----	70	Slight		Slight		Moderately suited Low strength	0.50
LuC: Lilbert-----	90	Slight		Slight		Well suited	
MaE: Maben-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope	0.50
MaG: Maben-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
McA: Metcalf-----	80	Slight		Slight		Moderately suited Low strength	0.50
MeA: Metcalf-----	45	Slight		Slight		Moderately suited Low strength	0.50
Sawtown-----	35	Slight		Slight		Well suited	
MfA: Metcalf-----	55	Slight		Slight		Moderately suited Low strength	0.50
Timpson-----	35	Slight		Slight		Moderately suited Low strength	0.50

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part II—Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MhC: Meth-----	80	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
MpA: Mollville-----	60	Slight		Slight		Poorly suited Ponding Wetness Low strength	1.00 1.00 0.50
Besner-----	35	Slight		Slight		Moderately suited Low strength	0.50
Ow: Owentown-----	85	Slight		Slight		Poorly suited Flooding	1.00
Ox: Owentown-----	90	Slight		Slight		Poorly suited Flooding	1.00
RnB: Rentzel-----	70	Slight		Slight		Well suited	
SaC: Sacul-----	90	Slight		Moderate Slope/erodibility	0.50	Well suited	
SfA: Sawtown-----	80	Slight		Slight		Moderately suited Low strength	0.50
TnB: Tenaha-----	80	Slight		Slight		Well suited	
TnD: Tenaha-----	80	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope	0.50
TnG: Tenaha-----	80	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part III

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Well suited		Well suited		Moderately suited Low strength	0.50
Besner-----	40	Well suited		Well suited		Moderately suited Low strength	0.50
AtB: Attoyac-----	95	Well suited		Well suited		Moderately suited Low strength	0.50
AuD: Austonio-----	85	Well suited		Moderately suited Slope	0.50	Moderately suited Low strength	0.50
BaB: Bernaldo-----	90	Well suited		Well suited		Moderately suited Low strength	0.50
BeA: Besner-----	70	Well suited		Well suited		Moderately suited Low strength	0.50
BfC: Betis-----	95	Well suited		Well suited		Well suited	
BnA: Bonn-----	60	Well suited		Well suited		Moderately suited Low strength	0.50
Cart-----	40	Well suited		Well suited		Moderately suited Low strength	0.50
BwB: Bowie-----	80	Well suited		Well suited		Well suited	
CbE: Cuthbert-----	80	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index Slope	0.50 0.50	Moderately suited Low strength	0.50
CgE: Cuthbert-----	90	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index Slope Rock fragments	0.50 0.50 0.50	Well suited	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part III—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CrG: Cuthbert-----	80	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index Slope Rock fragments	0.50 0.50 0.50	Moderately suited Low strength	0.50
CsG: Cuthbert-----	90	Well suited		Poorly suited Slope	0.75	Moderately suited Low strength Slope	0.50 0.50
CtG: Cuthbert-----	80	Moderately suited Stickiness; high plasticity index	0.50	Poorly suited Slope Stickiness; high plasticity index	0.75 0.50	Moderately suited Low strength Slope	0.50 0.50
DaC: Darco-----	95	Well suited		Moderately suited Slope	0.50	Well suited	
DaE: Darco-----	90	Well suited		Moderately suited Slope	0.50	Well suited	
Dr: Dreka-----	80	Well suited		Well suited		Moderately suited Low strength	0.50
EeB: Eastwood-----	90	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
EeD: Eastwood-----	95	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index Slope	0.75 0.50	Moderately suited Low strength	0.50
ElA: Eastwood-----	50	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
Latex-----	40	Well suited		Well suited		Moderately suited Low strength	0.50
GaA: Gallime-----	48	Well suited		Well suited		Moderately suited Low strength	0.50
Guyton-----	42	Well suited		Well suited		Moderately suited Low strength	0.50
GaB: Gallime-----	90	Well suited		Well suited		Moderately suited Low strength	0.50

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part III—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GrB: Grapeland-----	85	Well suited		Well suited		Well suited	
GtA: Guyton-----	90	Poorly suited Wetness	0.75	Poorly suited Wetness	0.75	Poorly suited Wetness Low strength	1.00 0.50
HaB: Hainesville-----	90	Well suited		Well suited		Well suited	
Iu: Iulus-----	80	Well suited		Well suited		Moderately suited Low strength	0.50
KfC: Kirvin-----	95	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
KgC: Kirvin-----	90	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index Rock fragments	0.75 0.50	Well suited	
KsC: Kirvin-----	95	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index	0.75	Moderately suited Low strength	0.50
La: Laneville-----	85	Well suited		Well suited		Moderately suited Low strength	0.50
Lf: Laneville-----	80	Well suited		Well suited		Moderately suited Low strength	0.50
LtB: Latex-----	70	Well suited		Well suited		Moderately suited Low strength	0.50
LuC: Lilbert-----	90	Well suited		Well suited		Well suited	
MaE: Maben-----	90	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Stickiness; high plasticity index Slope	0.75 0.50	Well suited	
MaG: Maben-----	90	Poorly suited Stickiness; high plasticity index	0.75	Poorly suited Slope Stickiness; high plasticity index	0.75 0.75	Moderately suited Slope	0.50

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part III—Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
McA: Metcalf-----	80	Well suited		Well suited		Moderately suited Low strength	0.50
MeA: Metcalf-----	45	Well suited		Well suited		Moderately suited Low strength	0.50
Sawtown-----	35	Well suited		Well suited		Well suited	
MfA: Metcalf-----	55	Well suited		Well suited		Moderately suited Low strength	0.50
Timpson-----	35	Well suited		Well suited		Moderately suited Low strength	0.50
MhC: Meth-----	80	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Low strength	0.50
MpA: Mollville-----	60	Well suited		Well suited		Moderately suited Low strength	0.50
Besner-----	35	Well suited		Well suited		Moderately suited Low strength	0.50
Ow: Owentown-----	85	Well suited		Well suited		Well suited	
Ox: Owentown-----	90	Well suited		Well suited		Well suited	
RnB: Rentzel-----	70	Well suited		Well suited		Well suited	
SaC: Sacul-----	90	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Well suited	
SfA: Sawtown-----	80	Well suited		Well suited		Moderately suited Low strength	0.50
TnB: Tenaha-----	80	Well suited		Well suited		Well suited	
TnD: Tenaha-----	80	Well suited		Moderately suited Slope	0.50	Well suited	
TnG: Tenaha-----	80	Well suited		Poorly suited Slope	0.75	Moderately suited Slope	0.50
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part IV

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbA:					
Alazan-----	50	Well suited		Well suited	
Besner-----	40	Well suited		Well suited	
AtB:					
Attoyac-----	95	Well suited		Well suited	
AuD:					
Austonio-----	85	Well suited		Well suited	
BaB:					
Bernaldo-----	90	Well suited		Well suited	
BeA:					
Besner-----	70	Well suited		Well suited	
BfC:					
Betis-----	95	Well suited		Well suited	
BnA:					
Bonn-----	60	Well suited		Well suited	
Cart-----	40	Well suited		Well suited	
BwB:					
Bowie-----	80	Well suited		Well suited	
ChE:					
Cuthbert-----	80	Well suited		Well suited	
CgE:					
Cuthbert-----	90	Well suited		Well suited	
CrG:					
Cuthbert-----	80	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
CsG:					
Cuthbert-----	90	Poorly suited Slope	0.50	Poorly suited Slope	0.50
CtG:					
Cuthbert-----	80	Poorly suited Slope	0.50	Poorly suited Slope	0.50
DaC:					
Darco-----	95	Well suited		Well suited	
DaE:					
Darco-----	90	Well suited		Well suited	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Dr: Dreka-----	80	Well suited		Well suited	
EeB: Eastwood-----	90	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
EeD: Eastwood-----	95	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
ElA: Eastwood-----	50	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
Latex-----	40	Well suited		Well suited	
GaA: Gallime-----	48	Well suited		Well suited	
Guyton-----	42	Well suited		Well suited	
GaB: Gallime-----	90	Well suited		Well suited	
GrB: Grapeland-----	85	Well suited		Well suited	
GtA: Guyton-----	90	Unsuited Wetness	0.75	Unsuited Wetness	1.00
HaB: Hainesville-----	90	Well suited		Well suited	
Iu: Iulus-----	80	Well suited		Well suited	
KfC: Kirvin-----	95	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
KgC: Kirvin-----	90	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
KsC: Kirvin-----	95	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
La: Laneville-----	85	Well suited		Well suited	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Lf: Laneville-----	80	Well suited		Well suited	
LtB: Latex-----	70	Well suited		Well suited	
LuC: Lilbert-----	90	Well suited		Well suited	
MaE: Maben-----	90	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
MaG: Maben-----	90	Poorly suited Slope Stickiness; high plasticity index	0.50 0.50	Poorly suited Slope	0.50
McA: Metcalf-----	80	Well suited		Well suited	
MeA: Metcalf-----	45	Well suited		Well suited	
Sawtown-----	35	Well suited		Well suited	
MfA: Metcalf-----	55	Well suited		Well suited	
Timpson-----	35	Well suited		Well suited	
MhC: Meth-----	80	Well suited		Well suited	
MpA: Mollville-----	60	Well suited		Well suited	
Besner-----	35	Well suited		Well suited	
Ow: Owentown-----	85	Well suited		Well suited	
Ox: Owentown-----	90	Well suited		Well suited	
RnB: Rentzel-----	70	Well suited		Well suited	
SaC: Sacul-----	90	Poorly suited Stickiness; high plasticity index	0.50	Well suited	
SfA: Sawtown-----	80	Well suited		Well suited	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (surface)		Suitability for mechanical site preparation (deep)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TnB: Tenaha-----	80	Well suited		Well suited	
TnD: Tenaha-----	80	Well suited		Well suited	
TnG: Tenaha-----	80	Poorly suited Slope	0.50	Poorly suited Slope	0.50
W: Water-----	100	Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part V

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Moderate Texture/rock fragments	0.50	Low	
Besner-----	40	Moderate Texture/rock fragments	0.50	Low	
AtB: Attoyac-----	95	Moderate Texture/rock fragments	0.50	Low	
AuD: Austonio-----	85	Moderate Texture/rock fragments	0.50	Low	
BaB: Bernaldo-----	90	Moderate Texture/rock fragments	0.50	Low	
BeA: Besner-----	70	Moderate Texture/rock fragments	0.50	Low	
BfC: Betis-----	95	High Texture/rock fragments	1.00	Low	
BnA: Bonn-----	60	Moderate Texture/rock fragments	0.50	High Wetness	1.00
Cart-----	40	Low		Low	
BwB: Bowie-----	80	Moderate Texture/rock fragments	0.50	Low	
CbE: Cuthbert-----	80	Moderate Texture/rock fragments	0.50	Low	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CgE: Cuthbert-----	90	Moderate Texture/rock fragments	0.50	Low	
CrG: Cuthbert-----	80	Low		Low	
CsG: Cuthbert-----	90	Moderate Texture/rock fragments	0.50	Low	
CtG: Cuthbert-----	80	Moderate Texture/rock fragments	0.50	Low	
DaC: Darco-----	95	High Texture/rock fragments	1.00	Low	
DaE: Darco-----	90	High Texture/rock fragments	1.00	Low	
Dr: Dreka-----	80	Moderate Texture/rock fragments	0.50	High Wetness	1.00
EeB: Eastwood-----	90	Moderate Texture/rock fragments	0.50	Low	
EeD: Eastwood-----	95	Low		Low	
ElA: Eastwood-----	50	Moderate Texture/rock fragments	0.50	Low	
Latex-----	40	Moderate Texture/rock fragments	0.50	Low	
GaA: Gallime-----	48	Moderate Texture/rock fragments	0.50	Low	
Guyton-----	42	Low Texture/rock fragments	0.10	High Wetness	1.00

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GaB: Gallime-----	90	Low		Low	
GrB: Grapeland-----	85	High Texture/rock fragments	1.00	Low	
GtA: Guyton-----	90	Moderate Texture/rock fragments	0.50	High Wetness	1.00
HaB: Hainesville-----	90	High Texture/rock fragments	1.00	Low	
Iu: Iulus-----	80	Low		Low	
KfC: Kirvin-----	95	Moderate Texture/rock fragments	0.50	Low	
KgC: Kirvin-----	90	Moderate Texture/rock fragments	0.50	Low	
KsC: Kirvin-----	95	Low		Low	
La: Laneville-----	85	Low Texture/rock fragments	0.10	Low	
Lf: Laneville-----	80	Low Texture/rock fragments	0.10	Low	
LtB: Latex-----	70	Moderate Texture/rock fragments	0.50	Low	
LuC: Lilbert-----	90	High Texture/rock fragments	1.00	Low	
MaE: Maben-----	90	Low		Low	
MaG: Maben-----	90	Low		Low	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
McA: Metcalf-----	80	Moderate Texture/rock fragments	0.50	Low	
MeA: Metcalf-----	45	Moderate Texture/rock fragments	0.50	Low	
Sawtown-----	35	Moderate Texture/rock fragments	0.50	Low	
MfA: Metcalf-----	55	Moderate Texture/rock fragments	0.50	Low	
Timpson-----	35	Moderate Texture/rock fragments	0.50	Low	
MhC: Meth-----	80	Moderate Texture/rock fragments	0.50	Low	
MpA: Mollville-----	60	Moderate Texture/rock fragments	0.50	High Wetness	1.00
Besner-----	35	Moderate Texture/rock fragments	0.50	Low	
Ow: Owentown-----	85	Low		Low	
Ox: Owentown-----	90	Moderate Texture/rock fragments	0.50	Low	
RnB: Rentzel-----	70	High Texture/rock fragments	1.00	Low	
SaC: Sacul-----	90	Low Texture/rock fragments	0.10	Low	
SfA: Sawtown-----	80	Low		Low	

Soil Survey of Shelby County, Texas

Table 9.—Forest Management, Part V—Continued

Map symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TnB: Tenaha-----	80	High Texture/surface depth/rock fragments	1.00	Low	
TnD: Tenaha-----	80	High Texture/surface depth/rock fragments	1.00	Low	
TnG: Tenaha-----	80	High Texture/surface depth/rock fragments	1.00	Low	
W: Water-----	100	Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation

(Only the soils suitable for production of commercial trees are listed)

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
AbA:				
Alazan-----	Favorable	1,800	pinehill bluestem	50
	Normal	1,600	beaked panicum	10
	Unfavorable	1,500	longleaf uniola	10
			other perennial forbs	10
			American holly	5
			Carolina jessamine	5
			dogwood	5
			other trees	5
			panicum	5
			purpletop tridens	5
			southern waxmyrtle	5
			other perennial grasses	3
			yaupon	2
Besner-----	Favorable	1,800	pinehill bluestem	55
	Normal	1,600	yellow Indiangrass	15
	Unfavorable	1,500	big bluestem	10
			switchgrass	10
			American beautyberry	5
			eastern gramagrass	5
			greenbrier	5
			meadow dropseed	5
			other perennial forbs	5
			other perennial grasses	5
			other trees	5
			sideoats grama	5
			yaupon	5
			other shrubs	1
AtB:				
Attoyac-----	Favorable	1,300	pinehill bluestem	55
	Normal	1,050	American beautyberry	5
	Unfavorable	800	Carolina jessamine	5
			greenbrier	5
			longleaf uniola	5
			other perennial forbs	5
			other perennial grasses	5
			slender bluestem	5
			southern waxmyrtle	5
			splitbeard bluestem	5
			yaupon	5
			huckleberry	1
			other shrubs	1
			panicum	1
			sedge	1

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	
	Kind of year	Dry weight			
		Lb/acre		Pct	
AuD:					
Austonio-----	Favorable	1,300	American beautyberry	5	
	Normal	1,050	Carolina jessamine	5	
	Unfavorable	800	longleaf uniola	5	
			other perennial forbs	5	
			other perennial grasses	5	
			slender bluestem	5	
			southern waxmyrtle	5	
			splitbeard bluestem	5	
			yaupon	5	
			panicum	1	
			sedge	1	
	BaB:				
	Bernaldo-----	Favorable	1,300	pinehill bluestem	55
Normal		1,050	American beautyberry	5	
Unfavorable		800	Carolina jessamine	5	
			longleaf uniola	5	
			other perennial forbs	5	
			other perennial grasses	5	
			slender bluestem	5	
			southern waxmyrtle	5	
			splitbeard bluestem	5	
			yaupon	5	
			greenbrier	1	
			huckleberry	1	
			other shrubs	1	
			panicum	1	
			sedge	1	
BeA:					
Besner-----	Favorable	1,800	pinehill bluestem	55	
	Normal	1,600	yellow Indiangrass	15	
	Unfavorable	1,500	big bluestem	10	
			switchgrass	10	
			American beautyberry	5	
			eastern gramagrass	5	
			greenbrier	5	
			meadow dropseed	5	
			other perennial forbs	5	
			other perennial grasses	5	
			other trees	5	
			sideoats grama	5	
			yaupon	5	
			other shrubs	1	
	BfC:				
Betis-----	Favorable	3,000	arrowfeather threeawn	15	
	Normal	2,000	longleaf uniola	15	
	Unfavorable	1,200	mountain muhly	15	
			broomsedge bluestem	10	
			other perennial forbs	10	
			other perennial grasses	10	
			other shrubs	10	
			beaked panicum	5	
			purpletop tridens	5	
			yellow Indiangrass	5	

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
BwB:				
Bowie-----	Favorable	3,500	pinehill bluestem	50
	Normal	2,500	big bluestem	10
	Unfavorable	2,000	longleaf uniola	10
			pinewoods dropseed	10
			other perennial forbs	5
			other perennial grasses	5
			other shrubs	5
			yellow Indiangrass	5
			brownseed paspalum	1
			purpletop tridens	1
CbE:				
Cuthbert-----	Favorable	2,300	pinehill bluestem	50
	Normal	1,800	big bluestem	10
	Unfavorable	1,300	longleaf uniola	10
			Elliott's bluestem	5
			cutover muhly	5
			other perennial grasses	5
			other shrubs	5
			pinewoods dropseed	5
			brownseed paspalum	1
			purpletop tridens	1
			yellow Indiangrass	1
CgE:				
Cuthbert-----	Favorable	2,300	pinehill bluestem	50
	Normal	1,800	big bluestem	10
	Unfavorable	1,300	longleaf uniola	10
			Elliott's bluestem	5
			cutover muhly	5
			other perennial grasses	5
			other shrubs	5
			pinewoods dropseed	5
			brownseed paspalum	1
			purpletop tridens	1
			yellow Indiangrass	1
CsG:				
Cuthbert-----	Favorable	2,200	pinehill bluestem	50
	Normal	1,700	longleaf uniola	10
	Unfavorable	1,200	other perennial grasses	10
			pinewoods dropseed	10
			Elliott's bluestem	5
			big bluestem	5
			other perennial forbs	5
			other shrubs	5
			purpletop tridens	1
			yellow Indiangrass	1

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
CtG:				Pct
Cuthbert-----	Favorable	2,200	pinehill bluestem	50
	Normal	1,700	Elliott's bluestem	10
	Unfavorable	1,200	longleaf uniola	10
			other perennial grasses	10
			big bluestem	5
			other shrubs	5
			pineywoods dropseed	5
			brownseed paspalum	1
			cutover muhly	1
			purpletop tridens	1
			yellow Indiangrass	1
DaC:				
Darco-----	Favorable	1,650	pinehill bluestem	50
	Normal	1,350	longleaf uniola	10
	Unfavorable	1,000	Elliott's bluestem	5
			fringeleaf paspalum	5
			other annual forbs	5
			other trees	5
			pineywoods dropseed	5
			purple lovegrass	5
			splitbeard bluestem	5
			yellow Indiangrass	5
			purpletop tridens	1
DaE:				
Darco-----	Favorable	1,650	pinehill bluestem	50
	Normal	1,350	longleaf uniola	10
	Unfavorable	1,000	Elliott's bluestem	5
			fringeleaf paspalum	5
			other annual forbs	5
			other trees	5
			pineywoods dropseed	5
			purple lovegrass	5
			splitbeard bluestem	5
			yellow Indiangrass	5
			purpletop tridens	1
Dr:				
Dreka-----	Favorable	1,300	beaked panicum	25
	Normal	1,050	longleaf uniola	20
	Unfavorable	800	other perennial grasses	15
			purpletop tridens	15
			other perennial forbs	10
			switchcane	10
			other shrubs	5

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
EeB:				<u>Pct</u>
Eastwood-----	Favorable	1,300	other perennial grasses	15
	Normal	1,050	other shrubs	15
	Unfavorable	800	pinehill bluestem	15
			longleaf uniola	10
			other trees	10
			greenbrier	5
			hawthorn	5
			other perennial forbs	5
			panicum	5
			purpletop tridens	5
			southern red oak	5
			yellow Indiangrass	5
			sedge	1
			unknowns	1
EeD:				
Eastwood-----	Favorable	1,300	other perennial grasses	15
	Normal	1,050	other shrubs	15
	Unfavorable	800	pinehill bluestem	15
			longleaf uniola	10
			other trees	10
			greenbrier	5
			hawthorn	5
			other perennial forbs	5
			panicum	5
			purpletop tridens	5
			southern red oak	5
			yellow Indiangrass	5
			sedge	1
			unknowns	1
E1A:				
Eastwood-----	Favorable	1,300	other perennial grasses	15
	Normal	1,050	other shrubs	15
	Unfavorable	800	pinehill bluestem	15
			longleaf uniola	10
			other trees	10
			greenbrier	5
			hawthorn	5
			other perennial forbs	5
			panicum	5
			purpletop tridens	5
			southern red oak	5
			yellow Indiangrass	5
			sedge	1
			unknowns	1

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
ElA:				
Latex-----	Favorable	3,000	pinehill bluestem	20
	Normal	2,500	longleaf uniola	15
	Unfavorable	1,800	beaked panicum	10
			other perennial grasses	10
			other shrubs	10
			fringeleaf paspalum	5
			other perennial forbs	5
			other trees	5
			pineywoods dropseed	5
			sedge	5
			winged elm	5
			American beautyberry	1
			peppervine	1
			sassafras	1
GaA:				
Gallime-----	Favorable	3,000	beaked panicum	20
	Normal	2,000	longleaf uniola	20
	Unfavorable	1,500	pinehill bluestem	20
			American beautyberry	5
			greenbrier	5
			other perennial grasses	5
			other shrubs	5
			other trees	5
			panicum	5
			purpletop tridens	5
Guyton-----	Favorable	1,800	pinehill bluestem	50
	Normal	1,600	chalky bluestem	15
	Unfavorable	1,200	silver plumegrass	15
			other annual grasses	10
			unknowns	10
GaB:				
Gallime-----	Favorable	3,000	beaked panicum	20
	Normal	2,000	longleaf uniola	20
	Unfavorable	1,500	pinehill bluestem	20
			American beautyberry	5
			greenbrier	5
			other perennial grasses	5
			other shrubs	5
			other trees	5
			panicum	5
			purpletop tridens	5
GrB:				
Grapeland-----	Favorable	1,200	pinehill bluestem	25
	Normal	1,000	longleaf uniola	15
	Unfavorable	600	broomsedge bluestem	10
			other perennial grasses	10
			other shrubs	10
			arrowfeather threeawn	5
			beaked panicum	5
			purpletop tridens	5
			yellow Indiangrass	5

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
HaB:				Pct
Hainesville-----	Favorable	1,200	other shrubs	15
	Normal	1,000	longleaf uniola	10
	Unfavorable	600	other perennial forbs	10
			greenbrier	5
			purpletop tridens	5
			yellow Indiangrass	5
			big bluestem	1
			panicum	1
			sedge	1
Iu:				
Iulus-----	Favorable	1,800	pinehill bluestem	50
	Normal	1,500	beaked panicum	10
	Unfavorable	1,200	brownseed paspalum	10
			longleaf uniola	10
			spreading panicum	10
			other perennial forbs	5
			other shrubs	5
			Virginia wildrye	1
			big bluestem	1
			greenbrier	1
			purpletop tridens	1
			switchgrass	1
KfC:				
Kirvin-----	Favorable	2,000	pinehill bluestem	50
	Normal	1,300	longleaf uniola	10
	Unfavorable	1,000	American beautyberry	5
			brownseed paspalum	5
			other perennial forbs	5
			other perennial grasses	5
			other shrubs	5
			pineywoods dropseed	5
			purpletop tridens	5
			yellow Indiangrass	5
KgC:				
Kirvin-----	Favorable	2,400	pinehill bluestem	50
	Normal	1,900	longleaf uniola	10
	Unfavorable	1,500	other perennial grasses	10
			American beautyberry	5
			Elliott's bluestem	5
			brownseed paspalum	5
			other perennial forbs	5
			other shrubs	5
			yellow Indiangrass	5
KsC:				
Kirvin-----	Favorable	2,300	pinehill bluestem	50
	Normal	1,800	longleaf uniola	10
	Unfavorable	1,200	American beautyberry	5
			brownseed paspalum	5
			other perennial forbs	5
			other perennial grasses	5
			other shrubs	5
			pineywoods dropseed	5
			purpletop tridens	5
			yellow Indiangrass	5

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
La:				<u>Pct</u>
Laneville-----	Favorable	1,800	beaked panicum	25
	Normal	1,500	longleaf uniola	25
	Unfavorable	1,200	other perennial forbs	10
			other perennial grasses	10
			other shrubs	10
			pinehill bluestem	10
			plumegrass	5
			switchcane	5
Lf:				
Laneville-----	Favorable	1,800	beaked panicum	25
	Normal	1,500	longleaf uniola	25
	Unfavorable	1,200	other perennial forbs	10
			other perennial grasses	10
			other shrubs	10
			pinehill bluestem	20
			plumegrass	5
			switchcane	5
LtB:				
Latex-----	Favorable	3,000	pinehill bluestem	20
	Normal	2,500	longleaf uniola	15
	Unfavorable	1,800	beaked panicum	10
			other perennial grasses	10
			other shrubs	10
			fringeleaf paspalum	5
			other perennial forbs	5
			other trees	5
			pineywoods dropseed	5
			sedge	5
			winged elm	5
			American beautyberry	1
			peppervine	1
			sassafras	1
LuC:				
Lilbert-----	Favorable	1,500	pinehill bluestem	50
	Normal	1,200	Elliott's bluestem	10
	Unfavorable	900	longleaf uniola	10
			other perennial grasses	10
			pineywoods dropseed	10
			other perennial forbs	5
			yellow Indiangrass	5
			arrowfeather threeawn	1
			beaked panicum	1
			other shrubs	1
			purpletop tridens	1
MaE:				
Maben-----	Favorable	2,000	pinehill bluestem	25
	Normal	1,200	cutover muhly	17
	Unfavorable	800	longleaf uniola	17
			other perennial grasses	12
			other shrubs	12
			beaked panicum	9
			other perennial forbs	4
			panicum	4

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
MaG:				Pct
Maben-----	Favorable	2,000	pinehill bluestem	25
	Normal	1,200	cutover muhly	17
	Unfavorable	800	longleaf uniola	17
			other perennial grasses	12
			other shrubs	12
			beaked panicum	9
			other perennial forbs	4
			panicum	4
MfA:				
Metcalf-----	Favorable	1,800	pinehill bluestem	50
	Normal	1,600	beaked panicum	10
	Unfavorable	1,500	longleaf uniola	10
			other perennial forbs	10
			American holly	5
			Carolina jessamine	5
			dogwood	5
			other trees	5
			panicum	5
			purpletop tridens	5
			southern waxmyrtle	5
			other perennial grasses	3
			yaupon	2
Timpson-----	Favorable	1,800	pinehill bluestem	50
	Normal	1,600	American beautyberry	5
	Unfavorable	1,500	Carolina jessamine	5
			longleaf uniola	5
			other perennial forbs	5
			other perennial grasses	5
			other shrubs	5
			slender bluestem	5
			splitbeard bluestem	5
			yaupon	5
			greenbrier	1
			huckleberry	1
			panicum	1
			sedge	1
MhC:				
Meth-----	Favorable	3,500	longleaf uniola	28
	Normal	2,100	beaked panicum	18
	Unfavorable	1,500	panicum	14
			little bluestem	11
			pinehill bluestem	11
			rough tridens	7

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
MpA:				Pct
Mollville-----	Favorable	2,000	pinehill bluestem	35
	Normal	1,750	cutover muhly	10
	Unfavorable	1,400	longleaf uniola	10
			switchgrass	10
			beaked panicum	5
			blackgum	5
			other perennial forbs	5
			other perennial grasses	5
			other shrubs	5
			spreading panicum	5
			switchcane	5
			greenbrier	1
			longspike tridens	1
			southern waxmyrtle	1
			splitbeard bluestem	1
Besner-----	Favorable	1,800	pinehill bluestem	55
	Normal	1,600	yellow Indiangrass	15
	Unfavorable	1,500	big bluestem	10
			switchgrass	10
			American beautyberry	5
			eastern gramagrass	5
			greenbrier	5
			meadow dropseed	5
			other perennial forbs	5
			other perennial grasses	5
			other trees	5
			sideoats grama	5
			yaupon	5
			other shrubs	1
Ow:				
Owentown-----	Favorable	1,400	Virginia wildrye	15
	Normal	1,200	beaked panicum	15
	Unfavorable	1,000	longleaf uniola	15
			other perennial grasses	15
			panicum	15
			other shrubs	10
			other trees	10
			other perennial forbs	5
			Saccharum brevibarbe var.	1
			contortum	1
			switchcane	1
Ox:				
Owentown-----	Favorable	1,400	Virginia wildrye	15
	Normal	1,200	beaked panicum	15
	Unfavorable	1,000	longleaf uniola	15
			other perennial grasses	15
			panicum	15
			other shrubs	10
			other trees	10
			other perennial forbs	5
			Saccharum brevibarbe var.	1
			contortum	1
			switchcane	1

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight Lb/acre		
RnB:				Pct
Rentzel-----	Favorable	1,800	pinehill bluestem	50
	Normal	1,400	beaked panicum	10
	Unfavorable	1,000	longleaf uniola	10
			other perennial grasses	10
			other shrubs	10
			other perennial forbs	5
			purpletop tridens	5
			broomsedge bluestem	1
SfA:				
Sawtown-----	Favorable	3,200	pinehill bluestem	50
	Normal	2,000	American beautyberry	5
	Unfavorable	1,200	Carolina jessamine	5
			longleaf uniola	5
			other perennial forbs	5
			other perennial grasses	5
			other shrubs	5
			slender bluestem	5
			southern waxmyrtle	5
			splitbeard bluestem	5
			yaupon	5
			greenbrier	1
			huckleberry	1
			panicum	1
			sedge	1
TnB:				
Tenaha-----	Favorable	2,500	pinehill bluestem	50
	Normal	2,000	Elliott's bluestem	10
	Unfavorable	1,250	longleaf uniola	10
			dogwood	5
			other perennial grasses	5
			other shrubs	5
			pineywoods dropseed	5
			slender bluestem	5
			yaupon	5
			yellow Indiangrass	5
			other grasslike perennials	1
TnD:				
Tenaha-----	Favorable	2,500	pinehill bluestem	50
	Normal	2,000	Elliott's bluestem	10
	Unfavorable	1,250	longleaf uniola	10
			dogwood	5
			other perennial grasses	5
			other shrubs	5
			pineywoods dropseed	5
			slender bluestem	5
			yaupon	5
			yellow Indiangrass	5
			other grasslike perennials	1

Soil Survey of Shelby County, Texas

Table 10.—Woodland Understory Vegetation—Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
TnG: Tenaha-----	Favorable	2,500	pinehill bluestem	50
	Normal	2,000	Elliott's bluestem	10
	Unfavorable	1,250	longleaf uniola	10
			dogwood	5
			other perennial grasses	5
			other shrubs	5
			pinewoods dropseed	5
			slender bluestem	5
			yaupon	5
			yellow Indiangrass	5
			other grasslike perennials	1

Soil Survey of Shelby County, Texas

Table 11.—Recreation, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA:							
Alazan-----	50	Somewhat limited Depth to saturated zone	0.39	Somewhat limited Depth to saturated zone	0.19	Somewhat limited Depth to saturated zone	0.39
Besner-----	40	Not limited		Not limited		Not limited	
AtB:							
Attoyac-----	95	Not limited		Not limited		Somewhat limited Slope	0.03
AuD:							
Austonio-----	85	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Very limited Slope	1.00
BaB:							
Bernaldo-----	90	Not limited		Not limited		Not limited	
BeA:							
Besner-----	70	Not limited		Not limited		Not limited	
BfC:							
Betis-----	95	Somewhat limited Too sandy	0.96	Somewhat limited Too sandy	0.96	Somewhat limited Too sandy Slope	0.96 0.50
BnA:							
Bonn-----	60	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	1.00	Slow water movement	1.00
Cart-----	40	Not limited		Not limited		Not limited	
BwB:							
Bowie-----	80	Not limited		Not limited		Somewhat limited Slope	0.12
CbE:							
Cuthbert-----	80	Somewhat limited Slow water movement	0.50	Somewhat limited Slow water movement	0.50	Very limited Slope	1.00
		Slope	0.16	Slope	0.16	Slow water movement	0.50
						Gravel content	0.01
CgE:							
Cuthbert-----	90	Somewhat limited Slow water movement	0.50	Somewhat limited Slow water movement	0.50	Very limited Slope	1.00
		Gravel content	0.24	Gravel content	0.24	Gravel content	1.00
		Slope	0.16	Slope	0.16	Slow water movement	0.50

Soil Survey of Shelby County, Texas

Table 11.—Recreation, Part I—Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CrG: Cuthbert-----	80	Somewhat limited Slow water movement Gravel content Slope	0.50 0.29 0.16	Somewhat limited Slow water movement Gravel content Slope	0.50 0.29 0.16	Very limited Slope Gravel content Slow water movement	1.00 1.00 0.50
CsG: Cuthbert-----	90	Very limited Slope Slow water movement	1.00 0.50	Very limited Slope Slow water movement	1.00 0.50	Very limited Slope Slow water movement	1.00 0.50
CtG: Cuthbert-----	80	Very limited Slope Slow water movement	1.00 0.50	Very limited Slope Slow water movement	1.00 0.50	Very limited Slope Slow water movement Gravel content	1.00 0.50 0.01
DaC: Darco-----	95	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Slope Too sandy	0.88 0.85
DaE: Darco-----	90	Somewhat limited Too sandy Slope	0.85 0.63	Somewhat limited Too sandy Slope	0.85 0.63	Very limited Slope Too sandy	1.00 0.85
Dr: Dreka-----	80	Very limited Flooding Depth to saturated zone Slow water movement	1.00 0.98 0.94	Somewhat limited Slow water movement Depth to saturated zone Flooding	0.94 0.75 0.40	Very limited Flooding Depth to saturated zone Slow water movement	1.00 0.98 0.94
EeB: Eastwood-----	90	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00	Very limited Slow water movement Slope	1.00 0.12
EeD: Eastwood-----	95	Very limited Slow water movement Slope	1.00 0.16	Very limited Slow water movement Slope	1.00 0.16	Very limited Slow water movement Slope	1.00 1.00
ElA: Eastwood-----	50	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00
Latex-----	40	Not limited		Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 11.--Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GaA: Gallime-----	48	Not limited		Not limited		Not limited	
Guyton-----	42	Very limited Depth to saturated zone Slow water movement	1.00 0.94	Very limited Depth to saturated zone Slow water movement	1.00 0.94	Very limited Depth to saturated zone Slow water movement	1.00 0.94
GaB: Gallime-----	90	Not limited		Not limited		Not limited	
GrB: Grapeland-----	85	Somewhat limited Too sandy	0.34	Somewhat limited Too sandy	0.34	Somewhat limited Too sandy Slope	0.34 0.12
GtA: Guyton-----	90	Very limited Depth to saturated zone Flooding Ponding Slow water movement	1.00 1.00 1.00 0.94	Very limited Ponding Depth to saturated zone Slow water movement Flooding	1.00 1.00 0.94 0.40	Very limited Depth to saturated zone Flooding Ponding Slow water movement	1.00 1.00 1.00 0.94
HaB: Hainesville-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy	1.00
Iu: Iulus-----	80	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
KfC: Kirvin-----	95	Somewhat limited Slow water movement	0.26	Somewhat limited Slow water movement	0.26	Somewhat limited Slow water movement Slope	0.26 0.12
KgC: Kirvin-----	90	Somewhat limited Gravel content Slow water movement	0.34 0.26	Somewhat limited Gravel content Slow water movement	0.34 0.26	Very limited Gravel content Slow water movement Slope	1.00 0.26 0.12
KsC: Kirvin-----	95	Somewhat limited Slow water movement	0.26	Somewhat limited Slow water movement	0.26	Somewhat limited Slow water movement Slope	0.26 0.12
La: Laneville-----	85	Very limited Flooding Slow water movement Depth to saturated zone	1.00 0.94 0.07	Somewhat limited Slow water movement Depth to saturated zone	0.94 0.03	Somewhat limited Slow water movement Flooding Depth to saturated zone	0.94 0.60 0.07

Soil Survey of Shelby County, Texas

Table 11.--Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Lf: Laneville-----	80	Very limited Flooding Slow water movement Depth to saturated zone	1.00 0.94 0.07	Somewhat limited Slow water movement Flooding Depth to saturated zone	0.94 0.40 0.03	Very limited Flooding Slow water movement Depth to saturated zone	1.00 0.94 0.07
LtB: Latex-----	70	Not limited		Not limited		Not limited	
LuC: Lilbert-----	90	Somewhat limited Too sandy Slow water movement	0.85 0.26	Somewhat limited Too sandy Slow water movement	0.85 0.26	Somewhat limited Too sandy Slow water movement Slope	0.85 0.26 0.12
MaE: Maben-----	90	Somewhat limited Slow water movement Slope	0.26 0.16	Somewhat limited Slow water movement Slope	0.26 0.16	Very limited Slope Slow water movement	1.00 0.26
MaG: Maben-----	90	Very limited Slope Slow water movement	1.00 0.26	Very limited Slope Slow water movement	1.00 0.26	Very limited Slope Slow water movement	1.00 0.26
McA: Metcalf-----	80	Very limited Slow water movement Depth to saturated zone	1.00 0.39	Very limited Slow water movement Depth to saturated zone	1.00 0.19	Very limited Slow water movement Depth to saturated zone	1.00 0.39
MeA: Metcalf-----	45	Very limited Slow water movement Depth to saturated zone	1.00 0.39	Very limited Slow water movement Depth to saturated zone	1.00 0.19	Very limited Slow water movement Depth to saturated zone	1.00 0.39
Sawtown-----	35	Not limited		Not limited		Not limited	
MfA: Metcalf-----	55	Very limited Slow water movement Depth to saturated zone	1.00 0.39	Very limited Slow water movement Depth to saturated zone	1.00 0.19	Very limited Slow water movement Depth to saturated zone	1.00 0.39
Timpson-----	35	Not limited		Not limited		Not limited	
MhC: Meth-----	80	Somewhat limited Slow water movement	0.26	Somewhat limited Slow water movement	0.26	Somewhat limited Slow water movement Slope	0.26 0.12

Soil Survey of Shelby County, Texas

Table 11.--Recreation, Part I--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MpA: Mollville-----	60	Very limited Depth to saturated zone Ponding Slow water movement	1.00 1.00 0.96	Very limited Ponding Depth to saturated zone Slow water movement	1.00 1.00 0.96	Very limited Depth to saturated zone Ponding Slow water movement	1.00 1.00 0.96
Besner-----	35	Not limited		Not limited		Not limited	
Ow: Owentown-----	85	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
Ox: Owentown-----	90	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
RnB: Rentzel-----	70	Somewhat limited Too sandy Slow water movement Depth to saturated zone	0.92 0.26 0.07	Somewhat limited Too sandy Slow water movement Depth to saturated zone	0.92 0.26 0.03	Somewhat limited Too sandy Slow water movement Slope Depth to saturated zone	0.92 0.26 0.12 0.07
SaC: Sacul-----	90	Somewhat limited Slow water movement	0.94	Somewhat limited Slow water movement	0.94	Somewhat limited Slow water movement Slope Gravel content	0.94 0.12 0.06
SfA: Sawtown-----	80	Not limited		Not limited		Not limited	
TnB: Tenaha-----	80	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy Slope Gravel content	0.85 0.12 0.01
TnD: Tenaha-----	80	Somewhat limited Too sandy Slope	0.85 0.16	Somewhat limited Too sandy Slope	0.85 0.16	Very limited Slope Too sandy Gravel content	1.00 0.85 0.01
TnG: Tenaha-----	80	Very limited Slope Too sandy	1.00 0.85	Very limited Slope Too sandy	1.00 0.85	Very limited Slope Too sandy Gravel content	1.00 0.85 0.01
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 11.—Recreation, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Besner-----	40	Not limited		Not limited		Not limited	
AtB: Attoyac-----	95	Not limited		Not limited		Not limited	
AuD: Austonio-----	85	Not limited		Not limited		Somewhat limited Slope	0.01
BaB: Bernaldo-----	90	Not limited		Not limited		Not limited	
BeA: Besner-----	70	Not limited		Not limited		Not limited	
BfC: Betis-----	95	Somewhat limited Too sandy	0.96	Somewhat limited Too sandy	0.96	Somewhat limited Droughty	0.18
BnA: Bonn-----	60	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Cart-----	40	Not limited		Not limited		Not limited	
BwB: Bowie-----	80	Not limited		Not limited		Not limited	
CbE: Cuthbert-----	80	Not limited		Not limited		Somewhat limited Slope	0.16
CgE: Cuthbert-----	90	Not limited		Not limited		Somewhat limited Gravel content Slope	0.24 0.16
CrG: Cuthbert-----	80	Not limited		Not limited		Somewhat limited Gravel content Slope	0.29 0.16
CsG: Cuthbert-----	90	Somewhat limited Slope	0.50	Not limited		Very limited Slope	1.00

Soil Survey of Shelby County, Texas

Table 11.—Recreation, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CtG: Cuthbert-----	80	Very limited Slope	1.00	Not limited		Very limited Slope	1.00
DaC: Darco-----	95	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Droughty	0.34
DaE: Darco-----	90	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Slope Droughty	0.63 0.42
Dr: Dreka-----	80	Somewhat limited Depth to saturated zone Flooding	0.44 0.40	Somewhat limited Depth to saturated zone Flooding	0.44 0.40	Very limited Flooding Depth to saturated zone	1.00 0.75
EeB: Eastwood-----	90	Not limited		Not limited		Not limited	
EeD: Eastwood-----	95	Very limited Water erosion	1.00	Very limited Water erosion	1.00	Somewhat limited Slope	0.16
ElA: Eastwood-----	50	Not limited		Not limited		Not limited	
Latex-----	40	Not limited		Not limited		Not limited	
GaA: Gallime-----	48	Not limited		Not limited		Not limited	
Guyton-----	42	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
GaB: Gallime-----	90	Not limited		Not limited		Not limited	
GrB: Grapeland-----	85	Somewhat limited Too sandy	0.34	Somewhat limited Too sandy	0.34	Somewhat limited Droughty	0.12
GtA: Guyton-----	90	Very limited Depth to saturated zone Ponding Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Ponding Flooding	1.00 1.00 0.40	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
HaB: Hainesville-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Somewhat limited Droughty	0.79
Iu: Iulus-----	80	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding	1.00

Soil Survey of Shelby County, Texas

Table 11.—Recreation, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
KfC: Kirvin-----	95	Not limited		Not limited		Not limited	
KgC: Kirvin-----	90	Not limited		Not limited		Somewhat limited Gravel content	0.34
KsC: Kirvin-----	95	Not limited		Not limited		Not limited	
La: Laneville-----	85	Not limited		Not limited		Somewhat limited Flooding Depth to saturated zone	0.60 0.03
Lf: Laneville-----	80	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding Depth to saturated zone	1.00 0.03
LtB: Latex-----	70	Not limited		Not limited		Not limited	
LuC: Lilbert-----	90	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Droughty	0.09
MaE: Maben-----	90	Not limited		Not limited		Somewhat limited Slope	0.16
MaG: Maben-----	90	Very limited Slope	1.00	Not limited		Very limited Slope	1.00
McA: Metcalf-----	80	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
MeA: Metcalf-----	45	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Sawtown-----	35	Not limited		Not limited		Not limited	
MfA: Metcalf-----	55	Not limited		Not limited		Somewhat limited Depth to saturated zone	0.19
Timpson-----	35	Not limited		Not limited		Not limited	
MhC: Meth-----	80	Not limited		Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 11.—Recreation, Part II—Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MpA: Mollville-----	60	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Ponding Depth to saturated zone	1.00 1.00
Besner-----	35	Not limited		Not limited		Not limited	
Ow: Owentown-----	85	Not limited		Not limited		Somewhat limited Flooding	0.60
Ox: Owentown-----	90	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
RnB: Rentzel-----	70	Somewhat limited Too sandy	0.92	Somewhat limited Too sandy	0.92	Somewhat limited Droughty Depth to saturated zone	0.04 0.03
SaC: Sacul-----	90	Not limited		Not limited		Not limited	
SfA: Sawtown-----	80	Not limited		Not limited		Not limited	
TnB: Tenaha-----	80	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Droughty	0.08
TnD: Tenaha-----	80	Somewhat limited Too sandy	0.85	Somewhat limited Too sandy	0.85	Somewhat limited Slope Droughty	0.16 0.04
TnG: Tenaha-----	80	Very limited Slope Too sandy	1.00 0.85	Somewhat limited Too sandy	0.85	Very limited Slope	1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover		Domestic grasses and legumes for food and and cover		Irrigated grain and seed crops for food and cover	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Somewhat limited Wetness Droughty	0.75 0.01	Somewhat limited Wetness	0.75	Somewhat limited Wetness Droughty	0.75 0.01
Besner-----	40	Somewhat limited Droughty	0.03	Not limited		Somewhat limited Droughty	0.03
AtB: Attoyac-----	95	Not limited		Not limited		Not limited	
AuD: Austonio-----	85	Somewhat limited Droughty	0.16	Not limited		Very limited Slope Droughty	1.00 0.16
BaB: Bernaldo-----	90	Not limited		Not limited		Not limited	
BeA: Besner-----	70	Somewhat limited Droughty	0.08	Not limited		Somewhat limited Droughty	0.08
BfC: Betis-----	95	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.16	Very limited Droughty	1.00
BnA: Bonn-----	60	Very limited Wetness Percs slowly	1.00 1.00	Very limited Wetness Percs slowly	1.00 1.00	Very limited Wetness Percs slowly	1.00 1.00
Cart-----	40	Somewhat limited Droughty	0.08	Not limited		Somewhat limited Droughty	0.08
BwB: Bowie-----	80	Somewhat limited Droughty	0.32	Not limited		Somewhat limited Droughty	0.32
CbE: Cuthbert-----	80	Somewhat limited Droughty	0.75	Not limited		Very limited Slope Droughty	1.00 0.75
CgE: Cuthbert-----	90	Somewhat limited Droughty Too gravelly, cobbly, or stony	0.68 0.51	Somewhat limited Too gravelly, cobbly, or stony	0.51	Very limited Slope Droughty Too gravelly, cobbly, or stony	1.00 0.68 0.51

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part I—Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover		Domestic grasses and legumes for food and and cover		Irrigated grain and seed crops for food and cover	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CrG: Cuthbert-----	80	Somewhat limited Too gravelly, cobbly, or stony Droughty Too clayey	0.58 0.52 0.36	Somewhat limited Too gravelly, cobbly, or stony Too clayey	0.58 0.36	Very limited Slope Too gravelly, cobbly, or stony Droughty Too clayey	1.00 0.58 0.52 0.36
CsG: Cuthbert-----	90	Somewhat limited Droughty Slope	0.99 0.22	Somewhat limited Slope	0.22	Very limited Slope Droughty	1.00 0.99
CtG: Cuthbert-----	80	Somewhat limited Slope Droughty	0.78 0.61	Somewhat limited Slope	0.78	Very limited Slope Droughty	1.00 0.61
DaC: Darco-----	95	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.32	Very limited Droughty Slope	1.00 0.12
DaE: Darco-----	90	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.40	Very limited Droughty Slope	1.00 1.00
Dr: Dreka-----	80	Very limited Flooding Wetness Percs slowly	1.00 0.99 0.33	Very limited Flooding Wetness Percs slowly	1.00 0.99 0.33	Very limited Flooding Wetness Percs slowly	1.00 0.99 0.33
EeB: Eastwood-----	90	Somewhat limited Percs slowly	0.50	Somewhat limited Percs slowly	0.50	Somewhat limited Percs slowly	0.50
EeD: Eastwood-----	95	Somewhat limited Percs slowly	0.50	Somewhat limited Percs slowly	0.50	Very limited Slope Percs slowly	1.00 0.50
ElA: Eastwood-----	50	Somewhat limited Percs slowly	0.50	Somewhat limited Percs slowly	0.50	Somewhat limited Percs slowly	0.50
Latex-----	40	Somewhat limited Percs slowly Droughty	0.33 0.01	Somewhat limited Percs slowly	0.33	Somewhat limited Percs slowly Droughty	0.33 0.01
GaA: Gallime-----	48	Somewhat limited Droughty	0.08	Not limited		Somewhat limited Droughty	0.08
Guyton-----	42	Very limited Wetness Percs slowly	1.00 0.33	Very limited Wetness Percs slowly	1.00 0.33	Very limited Wetness Percs slowly	1.00 0.33

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part I—Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover		Domestic grasses and legumes for food and and cover		Irrigated grain and seed crops for food and cover	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GaB: Gallime-----	90	Somewhat limited Droughty	0.01	Not limited		Somewhat limited Droughty	0.01
GrB: Grapeland-----	85	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.11	Very limited Droughty	1.00
GtA: Guyton-----	90	Very limited Ponding Flooding Wetness Percs slowly	1.00 1.00 1.00 0.33	Very limited Ponding Flooding Wetness Percs slowly	1.00 1.00 1.00 0.33	Very limited Ponding Flooding Wetness Percs slowly	1.00 1.00 1.00 0.33
HaB: Hainesville-----	90	Very limited Droughty Too sandy	1.00 1.00	Somewhat limited Droughty Too sandy	0.78 0.50	Very limited Droughty Too sandy	1.00 0.50
Iu: Iulus-----	80	Somewhat limited Flooding Wetness	0.50 0.04	Somewhat limited Flooding Wetness	0.50 0.04	Very limited Flooding Wetness	1.00 0.04
KfC: Kirvin-----	95	Somewhat limited Droughty	0.54	Not limited		Somewhat limited Droughty	0.54
KgC: Kirvin-----	90	Somewhat limited Droughty Too gravelly, cobbly, or stony	0.65 0.57	Somewhat limited Too gravelly, cobbly, or stony	0.57	Somewhat limited Droughty Too gravelly, cobbly, or stony	0.65 0.57
KsC: Kirvin-----	95	Somewhat limited Droughty Too clayey	0.27 0.11	Somewhat limited Too clayey	0.11	Somewhat limited Droughty Too clayey	0.27 0.11
La: Laneville-----	85	Somewhat limited Flooding Wetness Percs slowly Droughty	0.50 0.44 0.33 0.02	Somewhat limited Flooding Wetness Percs slowly	0.50 0.44 0.33	Somewhat limited Flooding Wetness Percs slowly Droughty	0.50 0.44 0.33 0.02
Lf: Laneville-----	80	Somewhat limited Flooding Wetness Percs slowly Droughty	0.50 0.44 0.33 0.03	Somewhat limited Flooding Wetness Percs slowly	0.50 0.44 0.33	Very limited Flooding Wetness Percs slowly Droughty	1.00 0.44 0.33 0.03
LtB: Latex-----	70	Not limited		Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part I—Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover		Domestic grasses and legumes for food and and cover		Irrigated grain and seed crops for food and cover	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LuC: Lilbert-----	90	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.08	Very limited Droughty	1.00
MaE: Maben-----	90	Somewhat limited Droughty	0.89	Not limited		Very limited Slope Droughty	1.00 0.89
MaG: Maben-----	90	Somewhat limited Slope Droughty	0.78 0.68	Somewhat limited Slope	0.78	Very limited Slope Droughty	1.00 0.68
McA: Metcalf-----	80	Very limited Percs slowly Wetness	1.00 0.75	Very limited Percs slowly Wetness	1.00 0.75	Very limited Percs slowly Wetness	1.00 0.75
MeA: Metcalf-----	45	Very limited Percs slowly Potentially or highly erodible Wetness	1.00 1.00 0.75	Very limited Potentially or highly erodible Percs slowly Wetness	1.00 1.00 0.75	Very limited Percs slowly Potentially or highly erodible Wetness	1.00 1.00 0.75
Sawtown-----	35	Very limited Potentially or highly erodible Droughty	1.00 0.08	Very limited Potentially or highly erodible	1.00	Very limited Potentially or highly erodible Droughty	1.00 0.08
MfA: Metcalf-----	55	Very limited Percs slowly Potentially or highly erodible Wetness	1.00 1.00 0.75	Very limited Potentially or highly erodible Percs slowly Wetness	1.00 1.00 0.75	Very limited Percs slowly Potentially or highly erodible Wetness	1.00 1.00 0.75
Timpson-----	35	Very limited Potentially or highly erodible	1.00	Very limited Potentially or highly erodible	1.00	Very limited Potentially or highly erodible	1.00
MhC: Meth-----	80	Not limited		Not limited		Not limited	
MpA: Mollville-----	60	Very limited Ponding Wetness Percs slowly	1.00 1.00 0.48	Very limited Ponding Wetness Percs slowly	1.00 1.00 0.48	Very limited Ponding Wetness Percs slowly	1.00 1.00 0.48
Besner-----	35	Somewhat limited Droughty	0.08	Not limited		Somewhat limited Droughty	0.08
Ow: Owentown-----	85	Somewhat limited Flooding Droughty	0.50 0.08	Somewhat limited Flooding	0.50	Somewhat limited Flooding Droughty	0.50 0.08

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part I—Continued

Map symbol and soil name	Pct. of map unit	Grain and seed crops for food and cover		Domestic grasses and legumes for food and and cover		Irrigated grain and seed crops for food and cover	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ox: Owentown-----	90	Somewhat limited Flooding Droughty	0.50 0.08	Somewhat limited Flooding	0.50	Very limited Flooding Droughty	1.00 0.08
RnB: Rentzel-----	70	Very limited Droughty Too sandy Wetness	1.00 0.50 0.44	Somewhat limited Too sandy Wetness Droughty	0.50 0.44 0.03	Very limited Droughty Wetness	1.00 0.44
SaC: Sacul-----	90	Somewhat limited Percs slowly	0.33	Somewhat limited Percs slowly	0.33	Somewhat limited Percs slowly	0.33
SfA: Sawtown-----	80	Somewhat limited Droughty	0.10	Not limited		Somewhat limited Droughty	0.10
TnB: Tenaha-----	80	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.06	Very limited Droughty	1.00
TnD: Tenaha-----	80	Very limited Droughty Too sandy	1.00 0.50	Somewhat limited Too sandy Droughty	0.50 0.03	Very limited Droughty Slope	1.00 1.00
TnG: Tenaha-----	80	Somewhat limited Droughty Slope Too sandy	0.99 0.78 0.50	Somewhat limited Slope Too sandy	0.78 0.50	Very limited Slope Droughty	1.00 0.99
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Irrigated domestic grasses and legumes for food and cover		Habitat for burrowing mammals and reptiles	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Somewhat limited Wetness	0.75	Somewhat limited Wetness	0.75
Besner-----	40	Not limited		Not limited	
AtB: Attoyac-----	95	Not limited		Not limited	
AuD: Austonio-----	85	Very limited Slope	1.00	Not limited	
BaB: Bernaldo-----	90	Not limited		Not limited	
BeA: Besner-----	70	Not limited		Not limited	
BfC: Betis-----	95	Somewhat limited Droughty	0.16	Not limited	
BnA: Bonn-----	60	Very limited Wetness Percls slowly	1.00 1.00	Very limited Wetness	1.00
Cart-----	40	Not limited		Somewhat limited Dense layer	0.12
BwB: Bowie-----	80	Not limited		Not limited	
CbE: Cuthbert-----	80	Very limited Slope	1.00	Very limited Too clayey	1.00
CgE: Cuthbert-----	90	Very limited Slope Too gravelly, cobbly, or stony	1.00 0.51	Very limited Too clayey	1.00
CrG: Cuthbert-----	80	Very limited Slope Too gravelly, cobbly, or stony Too clayey	1.00 0.58 0.36	Very limited Too clayey	1.00

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part II—Continued

Map symbol and soil name	Pct. of map unit	Irrigated domestic grasses and legumes for food and cover		Habitat for burrowing mammals and reptiles	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CsG: Cuthbert-----	90	Very limited Slope	1.00	Not limited	
CtG: Cuthbert-----	80	Very limited Slope	1.00	Very limited Too clayey	1.00
DaC: Darco-----	95	Somewhat limited Droughty Slope	0.32 0.12	Very limited Dense layer	1.00
DaE: Darco-----	90	Very limited Slope Droughty	1.00 0.40	Very limited Dense layer	1.00
Dr: Dreka-----	80	Very limited Flooding Wetness Percls slowly	1.00 0.99 0.33	Very limited Flooding Wetness	1.00 0.99
EeB: Eastwood-----	90	Somewhat limited Percls slowly	0.50	Very limited Too clayey	1.00
EeD: Eastwood-----	95	Very limited Slope Percls slowly	1.00 0.50	Very limited Too clayey	1.00
ElA: Eastwood-----	50	Somewhat limited Percls slowly	0.50	Very limited Too clayey	1.00
Latex-----	40	Somewhat limited Percls slowly	0.33	Not limited	
GaA: Gallime-----	48	Not limited		Not limited	
Guyton-----	42	Very limited Wetness Percls slowly	1.00 0.33	Very limited Wetness Too clayey	1.00 0.01
GaB: Gallime-----	90	Not limited		Not limited	
GrB: Grapeland-----	85	Somewhat limited Droughty	0.11	Not limited	
GtA: Guyton-----	90	Very limited Ponding Flooding Wetness Percls slowly	1.00 1.00 1.00 0.33	Very limited Ponding Wetness Flooding Too clayey	1.00 1.00 1.00 0.01

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part II—Continued

Map symbol and soil name	Pct. of map unit	Irrigated domestic grasses and legumes for food and cover		Habitat for burrowing mammals and reptiles	
		Rating class and limiting features	Value	Rating class and limiting features	Value
HaB: Hainesville-----	90	Somewhat limited Droughty Too sandy	0.78 0.50	Not limited	
Iu: Iulus-----	80	Very limited Flooding Wetness	1.00 0.04	Very limited Flooding Wetness	1.00 0.04
KfC: Kirvin-----	95	Not limited		Very limited Too clayey	1.00
KgC: Kirvin-----	90	Somewhat limited Too gravelly, cobbly, or stony	0.57	Very limited Too clayey	1.00
KsC: Kirvin-----	95	Somewhat limited Too clayey	0.11	Very limited Too clayey	1.00
La: Laneville-----	85	Somewhat limited Flooding Wetness Percs slowly	0.50 0.44 0.33	Very limited Flooding Wetness	1.00 0.44
Lf: Laneville-----	80	Very limited Flooding Wetness Percs slowly	1.00 0.44 0.33	Very limited Flooding Wetness	1.00 0.44
LtB: Latex-----	70	Not limited		Not limited	
LuC: Lilbert-----	90	Somewhat limited Droughty	0.08	Not limited	
MaE: Maben-----	90	Very limited Slope	1.00	Very limited Too clayey	1.00
MaG: Maben-----	90	Very limited Slope	1.00	Very limited Too clayey	1.00
McA: Metcalf-----	80	Very limited Percs slowly Wetness	1.00 0.75	Somewhat limited Wetness	0.75

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part II—Continued

Map symbol and soil name	Pct. of map unit	Irrigated domestic grasses and legumes for food and cover		Habitat for burrowing mammals and reptiles	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MeA:					
Metcalfe-----	45	Very limited Potentially or highly erodible Perchs slowly Wetness	1.00 1.00 0.75	Somewhat limited Wetness	0.75
Sawtown-----	35	Very limited Potentially or highly erodible	1.00	Not limited	
MfA:					
Metcalfe-----	55	Very limited Potentially or highly erodible Perchs slowly Wetness	1.00 1.00 0.75	Somewhat limited Wetness	0.75
Timpson-----	35	Very limited Potentially or highly erodible	1.00	Not limited Wetness	0.75
MhC:					
Meth-----	80	Not limited		Very limited Too clayey	1.00
MpA:					
Mollville-----	60	Very limited Ponding Wetness Perchs slowly	1.00 1.00 0.48	Very limited Ponding Wetness Too clayey	1.00 1.00 0.01
Besner-----	35	Not limited		Not limited	
Ow:					
Owentown-----	85	Somewhat limited Flooding	0.50	Very limited Flooding	1.00
Ox:					
Owentown-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00
RnB:					
Rentzel-----	70	Somewhat limited Wetness Droughty	0.44 0.03	Somewhat limited Wetness	0.44
SaC:					
Sacul-----	90	Somewhat limited Perchs slowly	0.33	Very limited Too clayey	1.00
SfA:					
Sawtown-----	80	Not limited		Not limited	
TnB:					
Tenaha-----	80	Somewhat limited Droughty	0.06	Not limited	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part II—Continued

Map symbol and soil name	Pct. of map unit	Irrigated domestic grasses and legumes for food and cover		Habitat for burrowing mammals and reptiles	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TnD: Tenaha-----	80	Very limited Slope Droughty	1.00 0.03	Not limited	
TnG: Tenaha-----	80	Very limited Slope	1.00	Somewhat limited Too clayey	0.01
W: Water-----	100	Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 12.--Wildlife Habitat, Part III

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants		Upland shrubs and vines	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Somewhat limited Wetness	0.75	Somewhat limited Wetness	0.75
Besner-----	40	Not limited		Not limited	
AtB: Attoyac-----	95	Not limited		Not limited	
AuD: Austonio-----	85	Not limited		Not limited	
BaB: Bernaldo-----	90	Not limited		Not limited	
BeA: Besner-----	70	Not limited		Not limited	
BfC: Betis-----	95	Somewhat limited Too sandy Droughty	0.50 0.16	Somewhat limited Droughty	0.16
BnA: Bonn-----	60	Very limited Wetness	1.00	Very limited Wetness	1.00
Cart-----	40	Not limited		Not limited	
BwB: Bowie-----	80	Not limited		Not limited	
CbE: Cuthbert-----	80	Not limited		Not limited	
CgE: Cuthbert-----	90	Not limited		Not limited	
CrG: Cuthbert-----	80	Somewhat limited Too clayey	0.36	Somewhat limited Too clayey	0.36
CsG: Cuthbert-----	90	Not limited		Not limited	
CtG: Cuthbert-----	80	Not limited		Not limited	
DaC: Darco-----	95	Somewhat limited Too sandy Droughty	0.50 0.32	Somewhat limited Droughty	0.32

Soil Survey of Shelby County, Texas

Table 12.--Wildlife Habitat, Part III--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants	Value	Upland shrubs and vines	Value
		Rating class and limiting features		Rating class and limiting features	
DaE:					
Darco-----	90	Somewhat limited Too sandy Droughty	0.50 0.40	Somewhat limited Droughty	0.40
Dr:					
Dreka-----	80	Somewhat limited Wetness	0.99	Somewhat limited Wetness	0.99
EeB:					
Eastwood-----	90	Not limited		Not limited	
EeD:					
Eastwood-----	95	Not limited		Not limited	
ElA:					
Eastwood-----	50	Not limited		Not limited	
Latex-----	40	Not limited		Not limited	
GaA:					
Gallime-----	48	Not limited		Not limited	
Guyton-----	42	Very limited Wetness	1.00	Very limited Wetness	1.00
GaB:					
Gallime-----	90	Not limited		Not limited	
GrB:					
Grapeland-----	85	Somewhat limited Too sandy Droughty	0.50 0.11	Somewhat limited Droughty	0.11
GtA:					
Guyton-----	90	Very limited Wetness	1.00	Very limited Wetness	1.00
HaB:					
Hainesville-----	90	Very limited Too sandy Droughty	1.00 0.78	Somewhat limited Droughty Too sandy	0.78 0.50
Iu:					
Iulus-----	80	Somewhat limited Wetness	0.04	Somewhat limited Wetness	0.04
KfC:					
Kirvin-----	95	Not limited		Not limited	
KgC:					
Kirvin-----	90	Not limited		Not limited	
KsC:					
Kirvin-----	95	Somewhat limited Too clayey	0.11	Somewhat limited Too clayey	0.11

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part III—Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants		Upland shrubs and vines	
		Rating class and limiting features	Value	Rating class and limiting features	Value
La: Laneville-----	85	Somewhat limited Wetness	0.44	Somewhat limited Wetness	0.44
Lf: Laneville-----	80	Somewhat limited Wetness	0.44	Somewhat limited Wetness	0.44
LtB: Latex-----	70	Not limited		Not limited	
LuC: Lilbert-----	90	Somewhat limited Too sandy Droughty	0.50 0.08	Somewhat limited Droughty	0.08
MaE: Maben-----	90	Not limited		Not limited	
MaG: Maben-----	90	Not limited		Not limited	
McA: Metcalf-----	80	Somewhat limited Wetness	0.75	Somewhat limited Wetness	0.75
MeA: Metcalf-----	45	Somewhat limited Wetness	0.75	Somewhat limited Wetness	0.75
Sawtown-----	35	Not limited		Not limited	
MfA: Metcalf-----	55	Somewhat limited Wetness	0.75	Somewhat limited Wetness	0.75
Timpson-----	35	Not limited		Not limited	
MhC: Meth-----	80	Not limited		Not limited	
MpA: Mollville-----	60	Very limited Wetness	1.00	Very limited Wetness	1.00
Besner-----	35	Not limited		Not limited	
Ow: Owentown-----	85	Not limited		Not limited	
Ox: Owentown-----	90	Not limited		Not limited	
RnB: Rentzel-----	70	Somewhat limited Too sandy Wetness Droughty	0.50 0.44 0.03	Somewhat limited Wetness Droughty	0.44 0.03
SaC: Sacul-----	90	Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 12.--Wildlife Habitat, Part III--Continued

Map symbol and soil name	Pct. of map unit	Upland wild herbaceous plants		Upland shrubs and vines	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SfA: Sawtown-----	80	Not limited		Not limited	
TnB: Tenaha-----	80	Somewhat limited Too sandy Droughty	0.50 0.06	Somewhat limited Droughty	0.06
TnD: Tenaha-----	80	Somewhat limited Too sandy Droughty	0.50 0.03	Somewhat limited Droughty	0.03
TnG: Tenaha-----	80	Somewhat limited Too sandy	0.50	Not limited	
W: Water-----	100	Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part IV

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Upland deciduous trees		Upland coniferous trees		Upland mixed deciduous- conifer trees	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.86	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
Besner-----	40	Somewhat limited Depth to saturated zone	0.29	Not limited		Somewhat limited Depth to saturated zone	0.29
AtB: Attoyac-----	95	Not limited		Not limited		Not limited	
AuD: Austonio-----	85	Not limited		Not limited		Not limited	
BaB: Bernaldo-----	90	Not limited		Not limited		Very limited Growing season wetness	1.00
BeA: Besner-----	70	Somewhat limited Depth to saturated zone	0.29	Not limited		Somewhat limited Depth to saturated zone	0.29
BfC: Betis-----	95	Somewhat limited Droughty	0.16	Somewhat limited Droughty	0.16	Somewhat limited Droughty	0.16
BnA: Bonn-----	60	Very limited Depth to saturated zone	1.00	Very limited Wetness	1.00	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
Cart-----	40	Somewhat limited Depth to saturated zone	0.84	Not limited		Very limited Growing season wetness Depth to saturated zone	1.00 0.84
BwB: Bowie-----	80	Somewhat limited Depth to saturated zone	0.22	Not limited		Very limited Growing season wetness Depth to saturated zone	1.00 0.22
CbE: Cuthbert-----	80	Not limited		Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Upland deciduous trees		Upland coniferous trees		Upland mixed deciduous- conifer trees	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CgE: Cuthbert-----	90	Not limited		Not limited		Not limited	
CrG: Cuthbert-----	80	Not limited		Not limited		Not limited	
CsG: Cuthbert-----	90	Not limited		Not limited		Not limited	
CtG: Cuthbert-----	80	Not limited		Not limited		Not limited	
DaC: Darco-----	95	Somewhat limited Droughty	0.32	Somewhat limited Droughty	0.32	Somewhat limited Droughty	0.32
DaE: Darco-----	90	Somewhat limited Droughty	0.40	Somewhat limited Droughty	0.40	Somewhat limited Droughty	0.40
Dr: Dreka-----	80	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.99	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
EeB: Eastwood-----	90	Not limited		Not limited		Not limited	
EeD: Eastwood-----	95	Not limited		Not limited		Not limited	
ElA: Eastwood-----	50	Not limited		Not limited		Not limited	
Latex-----	40	Somewhat limited Depth to saturated zone	0.68	Not limited		Very limited Growing season wetness Depth to saturated zone	1.00 0.68
GaA: Gallime-----	48	Not limited		Not limited		Somewhat limited Growing season wetness	0.50
Guyton-----	42	Very limited Depth to saturated zone	1.00	Very limited Wetness	1.00	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
GaB: Gallime-----	90	Not limited		Not limited		Somewhat limited Growing season wetness	0.50

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Upland deciduous trees		Upland coniferous trees		Upland mixed deciduous- conifer trees	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GrB: Grapeland-----	85	Somewhat limited Droughty	0.11	Somewhat limited Droughty	0.11	Somewhat limited Droughty	0.11
GtA: Guyton-----	90	Very limited Depth to saturated zone	1.00	Very limited Wetness	1.00	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
HaB: Hainesville-----	90	Somewhat limited Droughty	0.78	Somewhat limited Droughty	0.78	Somewhat limited Droughty	0.78
Iu: Iulus-----	80	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.24	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
KfC: Kirvin-----	95	Not limited		Not limited		Not limited	
KgC: Kirvin-----	90	Not limited		Not limited		Not limited	
KsC: Kirvin-----	95	Not limited		Not limited		Not limited	
La: Laneville-----	85	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.68	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
Lf: Laneville-----	80	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.68	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
LtB: Latex-----	70	Somewhat limited Depth to saturated zone	0.68	Not limited		Very limited Growing season wetness Depth to saturated zone	1.00 0.68
LuC: Lilbert-----	90	Somewhat limited Droughty	0.08	Somewhat limited Droughty	0.08	Somewhat limited Droughty	0.08
MaE: Maben-----	90	Not limited		Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Upland deciduous trees		Upland coniferous trees		Upland mixed deciduous- conifer trees	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MaG: Maben-----	90	Not limited		Not limited		Not limited	
McA: Metcalf-----	80	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.86	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
MeA: Metcalf-----	45	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.86	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
Sawtown-----	35	Somewhat limited Depth to saturated zone	0.68	Not limited		Very limited Growing season wetness Depth to saturated zone	1.00 0.68
MfA: Metcalf-----	55	Very limited Depth to saturated zone	1.00	Somewhat limited Wetness	0.86	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
Timpson-----	35	Somewhat limited Depth to saturated zone	0.99	Somewhat limited Wetness	0.11	Somewhat limited Depth to saturated zone Growing season wetness	0.99 0.50
MhC: Meth-----	80	Not limited		Not limited		Not limited	
MpA: Mollville-----	60	Very limited Depth to saturated zone	1.00	Very limited Wetness	1.00	Very limited Depth to saturated zone Growing season wetness	1.00 1.00
Besner-----	35	Somewhat limited Depth to saturated zone	0.29	Not limited		Somewhat limited Depth to saturated zone	0.29
Ow: Owentown-----	85	Somewhat limited Depth to saturated zone	0.95	Somewhat limited Wetness	0.02	Very limited Growing season wetness Depth to saturated zone	1.00 0.95

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part IV—Continued

Map symbol and soil name	Pct. of map unit	Upland deciduous trees		Upland coniferous trees		Upland mixed deciduous- conifer trees	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ox: Owentown-----	90	Somewhat limited Depth to saturated zone	0.95	Somewhat limited Wetness	0.02	Very limited Growing season wetness Depth to saturated zone	1.00 0.95
RnB: Rentzel-----	70	Very limited Depth to saturated zone Droughty	1.00 0.03	Somewhat limited Wetness Droughty	0.68 0.03	Very limited Depth to saturated zone Growing season wetness Droughty	1.00 0.50 0.03
SaC: Sacul-----	90	Somewhat limited Depth to saturated zone	0.99	Somewhat limited Wetness	0.09	Very limited Growing season wetness Depth to saturated zone	1.00 0.99
SfA: Sawtown-----	80	Somewhat limited Depth to saturated zone	0.68	Not limited		Very limited Growing season wetness Depth to saturated zone	1.00 0.68
TnB: Tenaha-----	80	Somewhat limited Droughty	0.06	Somewhat limited Droughty	0.06	Somewhat limited Droughty	0.06
TnD: Tenaha-----	80	Somewhat limited Droughty	0.03	Somewhat limited Droughty	0.03	Somewhat limited Droughty	0.03
TnG: Tenaha-----	80	Not limited		Not limited		Not limited	
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part V

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA:							
Alazan-----	50	Very limited Infrequent flooding Too dry	1.00 0.53	Not limited		Somewhat limited Too dry Too acid	0.53 0.44
Besner-----	40	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.71	Very limited Too dry Too acid	1.00 0.44
AtB:							
Attoyac-----	95	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.44
AuD:							
Austonio-----	85	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.78
BaB:							
Bernaldo-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.22
BeA:							
Besner-----	70	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.71	Very limited Too dry Too acid	1.00 0.44
BfC:							
Betis-----	95	Very limited Too dry Infrequent flooding Too sandy	1.00 1.00 0.50	Very limited Too dry Droughty	1.00 0.16	Very limited Too dry Too acid	1.00 0.44
BnA:							
Bonn-----	60	Very limited Infrequent flooding	1.00	Not limited		Somewhat limited Too acid	0.01
Cart-----	40	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.16	Very limited Too dry Too acid	1.00 0.44

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part V—Continued

Map symbol and soil name	Pct. of map unit	Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BwB: Bowie-----	80	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.78	Very limited Too dry Too acid	1.00 0.78
CbE: Cuthbert-----	80	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 1.00
CgE: Cuthbert-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 1.00
CrG: Cuthbert-----	80	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 1.00
CsG: Cuthbert-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 1.00
CtG: Cuthbert-----	80	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 1.00
DaC: Darco-----	95	Very limited Too dry Infrequent flooding Too sandy	1.00 1.00 0.50	Very limited Too dry Droughty	1.00 0.32	Very limited Too dry Too acid	1.00 0.22
DaE: Darco-----	90	Very limited Too dry Infrequent flooding Too sandy	1.00 1.00 0.50	Very limited Too dry Droughty	1.00 0.40	Very limited Too dry Too acid	1.00 0.22
Dr: Dreka-----	80	Somewhat limited Long periods of flooding Too dry	0.50 0.14	Somewhat limited Flooding	0.50	Somewhat limited Too dry	0.14
EeB: Eastwood-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.99

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part V—Continued

Map symbol and soil name	Pct. of map unit	Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EeD: Eastwood-----	95	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.99
ElA: Eastwood-----	50	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.99
Latex-----	40	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.32	Very limited Too dry Too acid	1.00 0.92
GaA: Gallime-----	48	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.04
Guyton-----	42	Very limited Infrequent flooding	1.00	Not limited		Somewhat limited Too acid	0.92
GaB: Gallime-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.44
GrB: Grapeland-----	85	Very limited Too dry Infrequent flooding Too sandy	1.00 1.00 0.50	Very limited Too dry Droughty	1.00 0.11	Very limited Too dry Too acid	1.00 1.00
GtA: Guyton-----	90	Very limited Long periods of flooding Ponding	1.00 0.50	Very limited Flooding Ponding	1.00 1.00	Somewhat limited Too acid	0.44
HaB: Hainesville-----	90	Very limited Too sandy Too dry Infrequent flooding	1.00 1.00 1.00	Very limited Too dry Droughty	1.00 0.78	Very limited Too dry Too sandy Too acid	1.00 0.50 0.22
Iu: Iulus-----	80	Somewhat limited Too dry	0.98	Not limited		Somewhat limited Too dry Too acid	0.98 0.44

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part V—Continued

Map symbol and soil name	Pct. of map unit	Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
KfC: Kirvin-----	95	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.99
KgC: Kirvin-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.99
KsC: Kirvin-----	95	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 1.00
La: Laneville-----	85	Very limited Infrequent flooding Too dry	1.00 0.76	Not limited		Somewhat limited Too acid Too dry	0.99 0.76
Lf: Laneville-----	80	Somewhat limited Too dry	0.76	Not limited		Somewhat limited Too acid Too dry	0.99 0.76
LtB: Latex-----	70	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.32	Very limited Too dry Too acid	1.00 0.78
LuC: Lilbert-----	90	Very limited Too dry Infrequent flooding Too sandy	1.00 1.00 0.50	Very limited Too dry Droughty	1.00 0.08	Very limited Too dry Too acid	1.00 0.99
MaE: Maben-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.44
MaG: Maben-----	90	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.44
McA: Metcalf-----	80	Very limited Infrequent flooding Too dry	1.00 0.83	Not limited		Somewhat limited Too acid Too dry	0.92 0.53

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part V—Continued

Map symbol and soil name	Pct. of map unit	Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MeA:							
Metcalf-----	45	Very limited Infrequent flooding Too dry	1.00 0.53	Not limited		Somewhat limited Too acid Too dry	0.92 0.53
Sawtown-----	35	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.32	Very limited Too dry Too acid	1.00 0.92
MfA:							
Metcalf-----	55	Very limited Infrequent flooding Too dry	1.00 0.53	Not limited		Somewhat limited Too acid Too dry	0.92 0.53
Timpson-----	35	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.01	Very limited Too dry Too acid	1.00 1.00
MhC:							
Meth-----	80	Very limited Too dry Infrequent flooding	1.00 1.00	Very limited Too dry	1.00	Very limited Too dry Too acid	1.00 0.44
MpA:							
Mollville-----	60	Very limited Infrequent flooding Ponding	1.00 0.50	Very limited Ponding	1.00	Somewhat limited Too acid	0.44
Besner-----	35	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.71	Very limited Too dry Too acid	1.00 0.44
Ow:							
Owentown-----	85	Very limited Too dry Infrequent flooding	1.00 1.00	Somewhat limited Too dry	0.04	Very limited Too dry Too acid	1.00 0.14
Ox:							
Owentown-----	90	Very limited Too dry	1.00	Somewhat limited Too dry	0.04	Very limited Too dry Too acid	1.00 0.14
RnB:							
Rentzel-----	70	Very limited Infrequent flooding Too dry Too sandy	1.00 0.76 0.50	Somewhat limited Droughty	0.03	Very limited Too acid Too dry	1.00 0.76

Soil Survey of Shelby County, Texas

Table 12.—Wildlife Habitat, Part V—Continued

Map symbol and soil name	Pct. of map unit	Riparian herbaceous plants		Riparian shrubs, vines, and trees		Freshwater wetland plants	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SaC: Sacul-----	90	Very limited Too dry Infrequent flooding	 1.00 1.00	Somewhat limited Too dry	 0.01	Very limited Too dry Too acid	 1.00 0.99
SfA: Sawtown-----	80	Very limited Too dry Infrequent flooding	 1.00 1.00	Somewhat limited Too dry	 0.32	Very limited Too dry Too acid	 1.00 0.92
TnB: Tenaha-----	80	Very limited Too dry Infrequent flooding Too sandy	 1.00 1.00 0.50	Very limited Too dry Droughty	 1.00 0.06	Very limited Too dry Too acid	 1.00 1.00
TnD: Tenaha-----	80	Very limited Too dry Infrequent flooding Too sandy	 1.00 1.00 0.50	Very limited Too dry Droughty	 1.00 0.03	Very limited Too dry Too acid	 1.00 1.00
TnG: Tenaha-----	80	Very limited Too dry Infrequent flooding Too sandy	 1.00 1.00 0.50	Very limited Too dry	 1.00	Very limited Too dry Too acid	 1.00 1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Somewhat limited Depth to saturated zone	0.39	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.39
Besner-----	40	Not limited		Somewhat limited Depth to saturated zone	0.53	Not limited	
AtB: Attoyac-----	95	Not limited		Not limited		Not limited	
AuD: Austonio-----	85	Somewhat limited Shrink-swell Slope	0.50 0.01	Somewhat limited Shrink-swell Slope	0.50 0.01	Very limited Slope Shrink-swell	1.00 0.50
BaB: Bernaldo-----	90	Not limited		Somewhat limited Depth to saturated zone	0.15	Not limited	
BeA: Besner-----	70	Not limited		Somewhat limited Depth to saturated zone	0.53	Not limited	
BfC: Betis-----	95	Not limited		Not limited		Not limited	
BnA: Bonn-----	60	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Cart-----	40	Not limited		Somewhat limited Depth to saturated zone	0.82	Not limited	
BwB: Bowie-----	80	Not limited		Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.47	Not limited	
CbE: Cuthbert-----	80	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Shrink-swell Slope	0.50 0.16	Very limited Slope Shrink-swell	1.00 0.50
CgE: Cuthbert-----	90	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Shrink-swell Slope	0.50 0.16	Very limited Slope Shrink-swell	1.00 0.50

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CrG: Cuthbert-----	80	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Shrink-swell Slope	0.50 0.16	Very limited Slope Shrink-swell	1.00 0.50
CsG: Cuthbert-----	90	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50
CtG: Cuthbert-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50
DaC: Darco-----	95	Not limited		Not limited		Somewhat limited Slope	0.12
DaE: Darco-----	90	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
Dr: Dreka-----	80	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 0.98 0.50	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 0.98 0.50
EeB: Eastwood-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
EeD: Eastwood-----	95	Very limited Shrink-swell Slope	1.00 0.16	Very limited Shrink-swell Slope	1.00 0.16	Very limited Shrink-swell Slope	1.00 1.00
ElA: Eastwood-----	50	Very limited Shrink-swell	1.00	Somewhat limited Shrink-swell	0.50	Very limited Shrink-swell	1.00
Latex-----	40	Somewhat limited Shrink-swell	0.50	Very limited Shrink-swell Depth to saturated zone	1.00 0.73	Somewhat limited Shrink-swell	0.50
GaA: Gallime-----	48	Not limited		Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.15	Not limited	
Guyton-----	42	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GaB: Gallime-----	90	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.15	Somewhat limited Shrink-swell	0.50
GrB: Grapeland-----	85	Not limited		Not limited		Not limited	
GtA: Guyton-----	90	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
HaB: Hainesville-----	90	Not limited		Not limited		Not limited	
Iu: Iulus-----	80	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.99	Very limited Flooding	1.00
KfC: Kirvin-----	95	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
KgC: Kirvin-----	90	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
KsC: Kirvin-----	95	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
La: Laneville-----	85	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 0.50 0.07	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 0.50 0.07
Lf: Laneville-----	80	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.07
LtB: Latex-----	70	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to saturated zone Shrink-swell	0.73 0.50	Somewhat limited Shrink-swell	0.50
LuC: Lilbert-----	90	Not limited		Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MaE: Maben-----	90	Very limited Shrink-swell Slope	1.00 0.16	Very limited Shrink-swell Slope	1.00 0.16	Very limited Shrink-swell Slope	1.00 1.00
MaG: Maben-----	90	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00
McA: Metcalf-----	80	Somewhat limited Depth to saturated zone	0.39	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Somewhat limited Depth to saturated zone	0.39
MeA: Metcalf-----	45	Somewhat limited Depth to saturated zone	0.39	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Somewhat limited Depth to saturated zone	0.39
Sawtown-----	35	Not limited		Very limited Shrink-swell Depth to saturated zone	1.00 0.73	Not limited	
MfA: Metcalf-----	55	Somewhat limited Depth to saturated zone	0.39	Very limited Depth to saturated zone Shrink-swell	1.00 1.00	Somewhat limited Depth to saturated zone	0.39
Timpson-----	35	Not limited		Somewhat limited Depth to saturated zone	0.95	Not limited	
MhC: Meth-----	80	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
MpA: Mollville-----	60	Very limited Ponding Depth to saturated zone Shrink-swell	1.00 1.00 0.50	Very limited Ponding Depth to saturated zone Shrink-swell	1.00 1.00 0.50	Very limited Ponding Depth to saturated zone Shrink-swell	1.00 1.00 0.50
Besner-----	35	Not limited		Somewhat limited Depth to saturated zone	0.53	Not limited	
Ow: Owentown-----	85	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.90	Very limited Flooding	1.00

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part I—Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ox: Owentown-----	90	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.90	Very limited Flooding	1.00
RnB: Rentzel-----	70	Somewhat limited Depth to saturated zone	0.07	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.07
SaC: Sacul-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to saturated zone	1.00 0.95	Very limited Shrink-swell	1.00
SfA: Sawtown-----	80	Not limited		Somewhat limited Depth to saturated zone Shrink-swell	0.73 0.50	Not limited	
TnB: Tenaha-----	80	Not limited		Not limited		Not limited	
TnD: Tenaha-----	80	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
TnG: Tenaha-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Very limited Low strength Depth to saturated zone	1.00 0.19	Very limited Depth to saturated zone Cutbanks cave	1.00 0.10	Somewhat limited Depth to saturated zone	0.19
Besner-----	40	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.53 0.10	Not limited	
AtB: Attoyac-----	95	Somewhat limited Low strength	0.22	Somewhat limited Cutbanks cave	0.10	Not limited	
AuD: Austonio-----	85	Somewhat limited Shrink-swell Slope	0.50 0.01	Somewhat limited Cutbanks cave Slope	0.10 0.01	Somewhat limited Slope	0.01
BaB: Bernaldo-----	90	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.15 0.10	Not limited	
BeA: Besner-----	70	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.53 0.10	Not limited	
BfC: Betis-----	95	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.18
BnA: Bonn-----	60	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Cutbanks cave	1.00 0.10	Very limited Depth to saturated zone	1.00
Cart-----	40	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.82 0.10	Not limited	
BwB: Bowie-----	80	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.47 0.10	Not limited	

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChE: Cuthbert-----	80	Very limited Low strength Shrink-swell Slope	1.00 0.50 0.16	Somewhat limited Too clayey Slope Cutbanks cave	0.28 0.16 0.10	Somewhat limited Slope	0.16
CgE: Cuthbert-----	90	Very limited Low strength Shrink-swell Slope	1.00 0.50 0.16	Somewhat limited Too clayey Slope Cutbanks cave	0.28 0.16 0.10	Somewhat limited Gravel content Slope	0.24 0.16
CrG: Cuthbert-----	80	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Too clayey Slope Cutbanks cave	0.28 0.16 0.10	Somewhat limited Gravel content Slope	0.29 0.16
CsG: Cuthbert-----	90	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope	1.00
CtG: Cuthbert-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.50	Very limited Slope Too clayey Cutbanks cave	1.00 0.28 0.10	Very limited Slope	1.00
DaC: Darco-----	95	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.34
DaE: Darco-----	90	Somewhat limited Slope	0.63	Very limited Cutbanks cave Slope	1.00 0.63	Somewhat limited Slope Droughty	0.63 0.42
Dr: Dreka-----	80	Very limited Flooding Low strength Depth to saturated zone Shrink-swell	1.00 1.00 0.75 0.50	Very limited Depth to saturated zone Flooding Cutbanks cave Too clayey	1.00 0.80 0.10 0.03	Very limited Flooding Depth to saturated zone	1.00 0.75
EeB: Eastwood-----	90	Very limited Low strength Shrink-swell	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.72 0.10	Not limited	
EeD: Eastwood-----	95	Very limited Low strength Shrink-swell Slope	1.00 1.00 0.16	Somewhat limited Too clayey Slope Cutbanks cave	0.72 0.16 0.10	Somewhat limited Slope	0.16

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ElA:							
Eastwood-----	50	Very limited Low strength Shrink-swell	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.72 0.10	Not limited	
Latex-----	40	Somewhat limited Low strength Shrink-swell	0.78 0.50	Somewhat limited Depth to saturated zone Too clayey Cutbanks cave	0.73 0.12 0.10	Not limited	
GaA:							
Gallime-----	48	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.15 0.10	Not limited	
Guyton-----	42	Very limited Depth to saturated zone Low strength	1.00 1.00	Very limited Depth to saturated zone Cutbanks cave	1.00 0.10	Very limited Depth to saturated zone	1.00
GaB:							
Gallime-----	90	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to saturated zone Cutbanks cave	0.15 0.10	Not limited	
GrB:							
Grapeland-----	85	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.12
GtA:							
Guyton-----	90	Very limited Ponding Depth to saturated zone Flooding Low strength	1.00 1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Flooding Cutbanks cave	1.00 1.00 0.80 0.10	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
HaB:							
Hainesville-----	90	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.79
Iu:							
Iulus-----	80	Very limited Flooding	1.00	Somewhat limited Depth to saturated zone Flooding Cutbanks cave	0.99 0.80 0.10	Very limited Flooding	1.00
KfC:							
Kirvin-----	95	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.28 0.10	Not limited	
KgC:							
Kirvin-----	90	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.28 0.10	Somewhat limited Gravel content	0.34

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
KsC: Kirvin-----	95	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.28 0.10	Not limited	
La: Laneville-----	85	Very limited Flooding Low strength Shrink-swell Depth to saturated zone	1.00 1.00 0.50 0.03 0.03	Very limited Depth to saturated zone Flooding Cutbanks cave Too clayey	1.00 1.00 0.60 0.10 0.03	Somewhat limited Flooding Depth to saturated zone	0.60 0.03
Lf: Laneville-----	80	Very limited Flooding Low strength Depth to saturated zone	1.00 1.00 0.03	Very limited Depth to saturated zone Flooding Cutbanks cave Too clayey	1.00 1.00 0.80 0.10 0.03	Very limited Flooding Depth to saturated zone	1.00 0.03
LtB: Latex-----	70	Somewhat limited Shrink-swell Low strength	0.50 0.22	Somewhat limited Depth to saturated zone Too clayey Cutbanks cave	0.73 0.12 0.10	Not limited	
LuC: Lilbert-----	90	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.09
MaE: Maben-----	90	Very limited Low strength Shrink-swell Slope	1.00 1.00 0.16	Somewhat limited Slope Too clayey Cutbanks cave	0.16 0.12 0.10	Somewhat limited Slope	0.16
MaG: Maben-----	90	Very limited Slope Low strength Shrink-swell	1.00 1.00 1.00	Very limited Slope Too clayey Cutbanks cave	1.00 0.12 0.10	Very limited Slope	1.00
McA: Metcalf-----	80	Very limited Low strength Depth to saturated zone	1.00 0.19	Very limited Depth to saturated zone Too clayey Cutbanks cave	1.00 0.50 0.10	Somewhat limited Depth to saturated zone	0.19
MeA: Metcalf-----	45	Very limited Low strength Depth to saturated zone	1.00 0.19	Very limited Depth to saturated zone Too clayey Cutbanks cave	1.00 0.50 0.10	Somewhat limited Depth to saturated zone	0.19

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MeA: Sawtown-----	35	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.73 0.10	Not limited	
MfA: Metcalf-----	55	Very limited Low strength Depth to saturated zone	1.00 0.19	Very limited Depth to saturated zone Too clayey Cutbanks cave	1.00 0.50 0.10	Somewhat limited Depth to saturated zone	0.19
Timpson-----	35	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.95 0.10	Not limited	
MhC: Meth-----	80	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.12 0.10	Not limited	
MpA: Mollville-----	60	Very limited Ponding Depth to saturated zone Shrink-swell Low strength	1.00 1.00 0.50 0.22	Very limited Ponding Depth to saturated zone Cutbanks cave	1.00 1.00 0.10	Very limited Ponding Depth to saturated zone	1.00 1.00
Besner-----	35	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave	0.53 0.10	Not limited	
Ow: Owentown-----	85	Very limited Flooding	1.00	Somewhat limited Depth to saturated zone Flooding Cutbanks cave	0.90 0.60 0.10	Somewhat limited Flooding	0.60
Ox: Owentown-----	90	Very limited Flooding	1.00	Somewhat limited Depth to saturated zone Flooding Cutbanks cave	0.90 0.80 0.10	Very limited Flooding	1.00
RnB: Rentzel-----	70	Somewhat limited Depth to saturated zone	0.03	Very limited Depth to saturated zone Cutbanks cave	1.00 1.00	Somewhat limited Droughty Depth to saturated zone	0.04 0.03

Soil Survey of Shelby County, Texas

Table 13.—Building Site Development, Part II—Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SaC: Sacul-----	90	Very limited Shrink-swell Low strength	1.00 1.00	Somewhat limited Depth to saturated zone Too clayey Cutbanks cave	0.95 0.28 0.10	Not limited	
SfA: Sawtown-----	80	Not limited		Somewhat limited Depth to saturated zone Cutbanks cave Too clayey	0.73 0.10 0.03	Not limited	
TnB: Tenaha-----	80	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.08
TnD: Tenaha-----	80	Somewhat limited Slope	0.16	Very limited Cutbanks cave Slope	1.00 0.16	Somewhat limited Slope Droughty	0.16 0.04
TnG: Tenaha-----	80	Very limited Slope Low strength	1.00 0.22	Very limited Slope Cutbanks cave	1.00 1.00	Very limited Slope	1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbA:					
Alazan-----	50	Very limited Depth to saturated zone Slow water movement	1.00 0.50	Very limited Depth to saturated zone Seepage	1.00 0.50
Besner-----	40	Somewhat limited Depth to saturated zone Slow water movement	0.97 0.50	Very limited Seepage Depth to saturated zone	1.00 0.52
AtB:					
Attoyac-----	95	Somewhat limited Slow water movement	0.50	Somewhat limited Seepage Slope	0.50 0.02
AuD:					
Austonio-----	85	Very limited Seepage Slow water movement Slope	1.00 0.50 0.01	Very limited Seepage Slope	1.00 1.00
BaB:					
Bernaldo-----	90	Somewhat limited Slow water movement Depth to saturated zone	0.50 0.40	Very limited Seepage	1.00
BeA:					
Besner-----	70	Somewhat limited Depth to saturated zone Slow water movement	0.97 0.50	Very limited Seepage Depth to saturated zone	1.00 0.52
BfC:					
Betis-----	95	Very limited Seepage Filtering capacity	1.00 1.00	Very limited Seepage Slope	1.00 0.32
BnA:					
Bonn-----	60	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BnA: Cart-----	40	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Seepage	1.00
BwB: Bowie-----	80	Very limited Slow water movement Depth to saturated zone	1.00 0.94	Very limited Seepage Slope	1.00 0.08
ChE: Cuthbert-----	80	Very limited Slow water movement Slope	1.00 0.16	Very limited Slope	1.00
CgE: Cuthbert-----	90	Very limited Slow water movement Slope	1.00 0.16	Very limited Slope	1.00
CrG: Cuthbert-----	80	Very limited Slow water movement Slope	1.00 0.16	Very limited Slope	1.00
CsG: Cuthbert-----	90	Very limited Slow water movement Slope	1.00 1.00	Very limited Seepage Slope	1.00 1.00
CtG: Cuthbert-----	80	Very limited Slope Slow water movement	1.00 1.00	Very limited Slope	1.00
DaC: Darco-----	95	Somewhat limited Slow water movement	0.50	Very limited Seepage Slope	1.00 0.68
DaE: Darco-----	90	Somewhat limited Slope Slow water movement	0.63 0.50	Very limited Slope Seepage	1.00 1.00

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Dr: Dreka-----	80	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
EeB: Eastwood-----	90	Very limited Slow water movement	1.00	Somewhat limited Slope	0.08
EeD: Eastwood-----	95	Very limited Slow water movement Slope	1.00 0.16	Very limited Slope	1.00
E1A: Eastwood-----	50	Very limited Slow water movement	1.00	Not limited	
Latex-----	40	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Seepage	1.00
GaA: Gallime-----	48	Somewhat limited Slow water movement Depth to saturated zone	0.50 0.40	Very limited Seepage	1.00
Guyton-----	42	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone	1.00
GaB: Gallime-----	90	Somewhat limited Slow water movement Depth to saturated zone	0.50 0.40	Very limited Seepage	1.00
GrB: Grapeland-----	85	Very limited Seepage Filtering capacity	1.00 1.00	Very limited Seepage Slope	1.00 0.08

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GtA: Guyton-----	90	Very limited Flooding Slow water movement Ponding Depth to saturated zone	1.00 1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone Seepage	1.00 1.00 1.00 0.50
HaB: Hainesville-----	90	Very limited Seepage Filtering capacity	1.00 1.00	Very limited Seepage	1.00
Iu: Iulus-----	80	Very limited Flooding Depth to saturated zone Slow water movement	1.00 1.00 0.50	Very limited Flooding Seepage Depth to saturated zone	1.00 0.50 0.04
KfC: Kirvin-----	95	Very limited Slow water movement	1.00	Somewhat limited Slope	0.08
KgC: Kirvin-----	90	Very limited Slow water movement	1.00	Somewhat limited Slope	0.08
KsC: Kirvin-----	95	Very limited Slow water movement	1.00	Somewhat limited Slope	0.08
La: Laneville-----	85	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	1.00 0.50 0.44
Lf: Laneville-----	80	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	1.00 0.50 0.44
LtB: Latex-----	70	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Somewhat limited Seepage	0.50

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LuC: Lilbert-----	90	Very limited Slow water movement	1.00	Very limited Seepage Slope	1.00 0.08
MaE: Maben-----	90	Very limited Slow water movement Slope	1.00 0.16	Very limited Slope	1.00
MaG: Maben-----	90	Very limited Slope Slow water movement	1.00 1.00	Very limited Slope	1.00
McA: Metcalf-----	80	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.75
MeA: Metcalf-----	45	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.75
Sawtown-----	35	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Seepage	1.00
MfA: Metcalf-----	55	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.75
Timpson-----	35	Very limited Depth to saturated zone Slow water movement	1.00 1.00	Very limited Seepage	1.00
MhC: Meth-----	80	Very limited Slow water movement	1.00	Somewhat limited Seepage Slope	0.50 0.08

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MpA:					
Mollville-----	60	Very limited Slow water movement	1.00	Very limited Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00		
		Seepage	1.00		
Besner-----	35	Somewhat limited Depth to saturated zone	0.97	Very limited Seepage	1.00
		Slow water movement	0.50	Depth to saturated zone	0.52
Ow:					
Owentown-----	85	Very limited Flooding	1.00	Very limited Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Seepage	0.50
Ox:					
Owentown-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage	1.00	Seepage	1.00
		Slow water movement	0.50		
RnB:					
Rentzel-----	70	Very limited Depth to saturated zone	1.00	Very limited Seepage	1.00
		Slow water movement	1.00	Depth to saturated zone	0.44
				Slope	0.08
SaC:					
Sacul-----	90	Very limited Slow water movement	1.00	Somewhat limited Slope	0.08
		Depth to saturated zone	1.00		
SfA:					
Sawtown-----	80	Very limited Slow water movement	1.00	Very limited Seepage	1.00
		Depth to saturated zone	1.00		
TnB:					
Tenaha-----	80	Very limited Slow water movement	1.00	Very limited Seepage	1.00
				Slope	0.08

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part I—Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TnD: Tenaha-----	80	Very limited Slow water movement Depth to bedrock Slope	1.00 0.52 0.16	Very limited Seepage Slope Depth to soft bedrock	1.00 1.00 0.08
TnG: Tenaha-----	80	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 0.81	Very limited Slope Seepage Depth to soft bedrock	1.00 1.00 0.50
W: Water-----	100	Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.86
Besner-----	40	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Seepage	1.00 1.00	Not limited	
AtB: Attoyac-----	95	Not limited		Not limited		Not limited	
AuD: Austonio-----	85	Very limited Seepage Slope	1.00 0.01	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01
BaB: Bernaldo-----	90	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Not limited	
BeA: Besner-----	70	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Seepage	1.00 1.00	Somewhat limited Seepage	0.50
BfC: Betis-----	95	Very limited Seepage Too sandy	1.00 0.50	Very limited Seepage	1.00	Very limited Seepage Too sandy	1.00 0.50
BnA: Bonn-----	60	Very limited Depth to saturated zone Too clayey	1.00 0.50	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Too clayey	1.00 0.50
Cart-----	40	Somewhat limited Depth to saturated zone	0.09	Not limited		Not limited	
BwB: Bowie-----	80	Not limited		Not limited		Not limited	
CbE: Cuthbert-----	80	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16
CgE: Cuthbert-----	90	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Too clayey Slope	1.00 0.16

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CrG: Cuthbert-----	80	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16
CsG: Cuthbert-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
CtG: Cuthbert-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
DaC: Darco-----	95	Somewhat limited Too sandy	0.50	Very limited Seepage	1.00	Very limited Seepage Too sandy	1.00 0.50
DaE: Darco-----	90	Somewhat limited Slope Too sandy	0.63 0.50	Very limited Seepage Slope	1.00 0.63	Very limited Seepage Slope Too sandy	1.00 0.63 0.50
Dr: Dreka-----	80	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Too clayey Depth to saturated zone	1.00 0.99
EeB: Eastwood-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
EeD: Eastwood-----	95	Very limited Too clayey Slope	1.00 0.16	Somewhat limited Slope	0.16	Very limited Too clayey Hard to compact Slope	1.00 1.00 0.16
E1A: Eastwood-----	50	Not limited		Not limited		Very limited Too clayey	1.00
Latex-----	40	Very limited Too clayey Depth to saturated zone	1.00 0.02	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
GaA: Gallime-----	48	Not limited		Very limited Seepage	1.00	Not limited	
Guyton-----	42	Very limited Depth to saturated zone Too clayey	1.00 0.50	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Too clayey	1.00 0.50

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GaB: Gallime-----	90	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
GrB: Grapeland-----	85	Very limited Seepage Too sandy	1.00 0.50	Very limited Seepage	1.00	Very limited Seepage Too sandy	1.00 0.50
GtA: Guyton-----	90	Very limited Flooding Depth to saturated zone Ponding Too clayey	1.00 1.00 1.00 0.50	Very limited Flooding Ponding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Too clayey	1.00 1.00 0.50
HaB: Hainesville-----	90	Very limited Seepage Too sandy	1.00 0.50	Very limited Seepage	1.00	Very limited Seepage Too sandy	1.00 0.50
Iu: Iulus-----	80	Very limited Flooding Depth to saturated zone	1.00 0.68	Very limited Flooding Depth to saturated zone	1.00 0.04	Somewhat limited Depth to saturated zone	0.24
KfC: Kirvin-----	95	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
KgC: Kirvin-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
KsC: Kirvin-----	95	Somewhat limited Too clayey	0.50	Not limited		Very limited Hard to compact Too clayey	1.00 0.50
La: Laneville-----	85	Very limited Flooding Too clayey Depth to saturated zone	1.00 1.00 0.95	Very limited Flooding Depth to saturated zone	1.00 0.44	Very limited Too clayey Hard to compact Depth to saturated zone	1.00 1.00 0.68
Lf: Laneville-----	80	Very limited Flooding Too clayey Depth to saturated zone	1.00 1.00 0.95	Very limited Flooding Depth to saturated zone	1.00 0.44	Very limited Too clayey Hard to compact Depth to saturated zone	1.00 1.00 0.68
LtB: Latex-----	70	Somewhat limited Depth to saturated zone	0.02	Not limited		Not limited	

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LuC: Lilbert-----	90	Not limited		Very limited Seepage	1.00	Not limited	
MaE: Maben-----	90	Somewhat limited Too clayey Slope	0.50 0.16	Somewhat limited Slope	0.16	Very limited Hard to compact Too clayey Slope	1.00 0.50 0.16
MaG: Maben-----	90	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
McA: Metcalf-----	80	Very limited Too clayey Depth to saturated zone	1.00 0.99	Somewhat limited Depth to saturated zone	0.75	Very limited Hard to compact Depth to saturated zone Too clayey	1.00 0.86 0.50
MeA: Metcalf-----	45	Very limited Too clayey Depth to saturated zone	1.00 0.99	Somewhat limited Depth to saturated zone	0.75	Very limited Hard to compact Depth to saturated zone	1.00 0.86
Sawtown-----	35	Somewhat limited Too clayey Depth to saturated zone	0.50 0.02	Very limited Seepage	1.00	Very limited Hard to compact	1.00
MfA: Metcalf-----	55	Very limited Too clayey Depth to saturated zone	1.00 0.99	Somewhat limited Depth to saturated zone	0.75	Very limited Hard to compact Depth to saturated zone	1.00 0.86
Timpson-----	35	Somewhat limited Depth to saturated zone	0.47	Very limited Seepage	1.00	Somewhat limited Seepage Depth to saturated zone	0.52 0.11
MhC: Meth-----	80	Not limited		Not limited		Not limited	
MpA: Mollville-----	60	Very limited Depth to saturated zone Ponding Seepage Too clayey	1.00 1.00 1.00 0.50	Very limited Ponding Depth to saturated zone	1.00 1.00	Very limited Ponding Depth to saturated zone Too clayey	1.00 1.00 0.50
Besner-----	35	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Seepage	1.00 1.00	Somewhat limited Seepage	0.50

Soil Survey of Shelby County, Texas

Table 14.—Sanitary Facilities, Part II—Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ow: Owentown-----	85	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.02
Ox: Owentown-----	90	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Somewhat limited Depth to saturated zone	0.02
RnB: Rentzel-----	70	Somewhat limited Depth to saturated zone	0.95	Very limited Seepage Depth to saturated zone	1.00 0.44	Somewhat limited Depth to saturated zone	0.68
SaC: Sacul-----	90	Very limited Too clayey Depth to saturated zone	1.00 0.44	Not limited		Very limited Too clayey Hard to compact Depth to saturated zone	1.00 1.00 0.09
SfA: Sawtown-----	80	Somewhat limited Too clayey Depth to saturated zone	0.50 0.02	Very limited Seepage	1.00	Somewhat limited Too clayey	0.50
TnB: Tenaha-----	80	Not limited		Very limited Seepage	1.00	Not limited	
TnD: Tenaha-----	80	Very limited Depth to bedrock Slope	1.00 0.16	Very limited Seepage Slope Depth to bedrock	1.00 0.16 0.08	Somewhat limited Slope Depth to bedrock	0.16 0.08
TnG: Tenaha-----	80	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 0.50
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part I

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
AbA:					
Alazan-----	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Besner-----	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AtB:					
Attoyac-----	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
AuD:					
Austonio-----	85	Poor		Poor	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
BaB:					
Bernaldo-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BeA:					
Besner-----	70	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
BfC:					
Betis-----	95	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.05
		Thickest layer	0.00	Thickest layer	0.05
BnA:					
Bonn-----	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Cart-----	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
BwB:					
Bowie-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
CbE:					
Cuthbert-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
CgE: Cuthbert-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CrG: Cuthbert-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CsG: Cuthbert-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CtG: Cuthbert-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
DaC: Darco-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.00 0.05
DaE: Darco-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.00 0.05
Dr: Dreka-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EeB: Eastwood-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EeD: Eastwood-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
ElA: Eastwood-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Latex-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GaA: Gallime-----	48	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
GaA: Guyton-----	42	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GaB: Gallime-----	90	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.01
GrB: Grapeland-----	85	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.02
		Thickest layer	0.00	Bottom layer	0.05
GtA: Guyton-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
HaB: Hainesville-----	90	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.02
		Thickest layer	0.00	Thickest layer	0.34
Iu: Iulus-----	80	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.02
KfC: Kirvin-----	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
KgC: Kirvin-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
KsC: Kirvin-----	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
La: Laneville-----	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Lf: Laneville-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
LtB: Latex-----	70	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
LuC: Lilbert-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.00 0.05
MaE: Maben-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MaG: Maben-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
McA: Metcalf-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MeA: Metcalf-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Sawtown-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MfA: Metcalf-----	55	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Timpson-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MhC: Meth-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MpA: Mollville-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.01
Besner-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ow: Owentown-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.02
Ox: Owentown-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.00 0.02

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part I—Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
RnB: Rentzel-----	70	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.07
SaC: Sacul-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
SfA: Sawtown-----	80	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.01
TnB: Tenaha-----	80	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.05
TnD: Tenaha-----	80	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.05
TnG: Tenaha-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
W: Water-----	100	Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Fair Too acid Organic matter content low	0.54 0.60	Poor Low strength Wetness depth	0.00 0.53	Fair Wetness depth	0.53
Besner-----	40	Fair Too acid Organic matter content low	0.54 0.88	Good		Fair Too acid	0.98
AtB: Attoyac-----	95	Fair Too acid Organic matter content low	0.54 0.88	Fair Low strength	0.78	Fair Too acid	0.98
AuD: Austonio-----	85	Fair Too acid Organic matter content low	0.32 0.60	Fair Shrink-swell	0.93	Fair Too acid Slope	0.88 0.99
BaB: Bernaldo-----	90	Fair Organic matter content low Too acid	0.60 0.68	Good		Good	
BeA: Besner-----	70	Fair Too acid Organic matter content low	0.54 0.88	Good		Fair Too acid	0.98
BfC: Betis-----	95	Poor Too sandy Wind erosion Too acid Organic matter content low	0.00 0.00 0.54 0.60	Good		Poor Too sandy Too acid	0.00 0.98
BnA: Bonn-----	60	Fair Water erosion Too acid	0.68 0.88	Poor Wetness depth Low strength	0.00 0.00	Poor Wetness depth	0.00
Cart-----	40	Fair Too acid Water erosion Organic matter content low	0.54 0.68 0.88	Good		Poor Hard to reclaim (dense layer) Too acid	0.00 0.98

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BwB: Bowie-----	80	Fair Too acid Organic matter content low	0.32 0.60	Poor Low strength	0.00	Fair Too acid	0.88
CbE: Cuthbert-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.18 0.50	Fair Shrink-swell	0.87	Poor Too clayey Too acid Slope Rock fragments	0.00 0.59 0.84 0.97
CgE: Cuthbert-----	90	Poor Too clayey Organic matter content low Too acid	0.00 0.18 0.50	Fair Shrink-swell	0.87	Poor Too clayey Too acid Slope Rock fragments	0.00 0.59 0.84 0.97
CrG: Cuthbert-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.12 0.50	Fair Shrink-swell	0.87	Poor Too clayey Too acid Slope Rock fragments	0.00 0.59 0.84 0.97
CsG: Cuthbert-----	90	Fair Too acid Organic matter content low	0.50 0.88	Fair Slope Shrink-swell	0.50 0.92	Poor Slope	0.00
CtG: Cuthbert-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.18 0.50	Poor Slope Shrink-swell	0.00 0.87	Poor Slope Too clayey Too acid Rock fragments	0.00 0.00 0.59 0.97
DaC: Darco-----	95	Poor Wind erosion Too sandy Too acid Organic matter content low	0.00 0.09 0.68 0.88	Good		Poor Hard to reclaim (dense layer) Too sandy	0.00 0.09
DaE: Darco-----	90	Poor Wind erosion Too sandy Too acid Organic matter content low	0.00 0.09 0.68 0.88	Good		Poor Hard to reclaim (dense layer) Too sandy Slope	0.00 0.09 0.37
Dr: Dreka-----	80	Fair Organic matter content low Water erosion	0.88 0.99	Poor Low strength Wetness depth Shrink-swell	0.00 0.14 0.41	Fair Wetness depth	0.14

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EeB: Eastwood-----	90	Poor Too clayey Too acid Water erosion Organic matter content low	0.00 0.12 0.68 0.88	Poor Low strength Shrink-swell	0.00 0.18	Poor Too clayey Too acid	0.00 0.59
EeD: Eastwood-----	95	Poor Too clayey Too acid Water erosion Organic matter content low	0.00 0.12 0.68 0.88	Poor Low strength Shrink-swell	0.00 0.27	Poor Too clayey Too acid Slope	0.00 0.59 0.84
ElA: Eastwood-----	50	Poor Too clayey Too acid Water erosion Organic matter content low	0.00 0.12 0.68 0.88	Poor Low strength Shrink-swell	0.00 0.34	Poor Too clayey Too acid	0.00 0.59
Latex-----	40	Fair Too acid Organic matter content low Water erosion	0.20 0.60 0.99	Poor Low strength Shrink-swell	0.00 0.66	Fair Too acid	0.88
GaA: Gallime-----	48	Fair Organic matter content low Too acid	0.60 0.84	Good		Good	
Guyton-----	42	Fair Too acid Organic matter content low Water erosion	0.20 0.88 0.90	Poor Wetness depth Low strength	0.00 0.00	Poor Wetness depth Too acid	0.00 0.76
GaB: Gallime-----	90	Fair Too acid Organic matter content low	0.54 0.60	Fair Shrink-swell	0.95	Fair Too acid	0.98
GrB: Grapeland-----	85	Poor Wind erosion Too sandy Organic matter content low Too acid	0.00 0.09 0.18 0.50	Good		Fair Too sandy Too acid	0.09 0.50

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GtA: Guyton-----	90	Fair Too acid Organic matter content low Water erosion	 0.54 0.88 0.90	Poor Wetness depth Low strength	 0.00 0.00	Poor Wetness depth Too acid	 0.00 0.98
HaB: Hainesville-----	90	Poor Wind erosion Too sandy Too acid Organic matter content low Droughty	 0.00 0.45 0.68 0.88 0.95	Good		Fair Too sandy	 0.45
Iu: Iulus-----	80	Fair Too acid Organic matter content low Water erosion Too sandy	 0.54 0.60 0.99 0.99	Fair Wetness depth	 0.98	Fair Wetness depth Too acid Too sandy	 0.98 0.98 0.99
KfC: Kirvin-----	95	Poor Too clayey Too acid Organic matter content low Water erosion	 0.00 0.12 0.60 0.99	Poor Low strength Shrink-swell	 0.00 0.89	Poor Too clayey Too acid	 0.00 0.59
KgC: Kirvin-----	90	Poor Too clayey Too acid Organic matter content low	 0.00 0.12 0.60	Poor Low strength Shrink-swell	 0.00 0.87	Poor Too clayey Too acid	 0.00 0.59
KsC: Kirvin-----	95	Poor Too clayey Too acid Organic matter content low	 0.00 0.03 0.60	Poor Low strength Shrink-swell	 0.00 0.87	Poor Too clayey Too acid	 0.00 0.59
La: Laneville-----	85	Fair Too acid Organic matter content low Water erosion	 0.50 0.60 0.99	Poor Low strength Shrink-swell Wetness depth	 0.00 0.66 0.76	Fair Wetness depth	 0.76
Lf: Laneville-----	80	Fair Too acid Organic matter content low Water erosion	 0.50 0.60 0.99	Poor Low strength Shrink-swell Wetness depth	 0.00 0.75 0.76	Fair Wetness depth	 0.76

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LtB: Latex-----	70	Fair Too acid Organic matter content low Water erosion	 0.32 0.60 0.99	Fair Low strength Shrink-swell	 0.78 0.84	Fair Rock fragments Too acid	 0.59 0.88
LuC: Lilbert-----	90	Poor Wind erosion Too sandy Too acid Organic matter content low	 0.00 0.09 0.50 0.68	Good		Fair Too sandy Too acid	 0.09 0.98
MaE: Maben-----	90	Poor Organic matter content low Too clayey Droughty Too acid	 0.00 0.00 0.48 0.54	Poor Low strength Shrink-swell	 0.00 0.12	Poor Too clayey Slope Too acid	 0.00 0.84 0.98
MaG: Maben-----	90	Poor Organic matter content low Too clayey Too acid Droughty	 0.00 0.00 0.54 0.68	Poor Low strength Slope Shrink-swell	 0.00 0.00 0.12	Poor Too clayey Slope Too acid	 0.00 0.84 0.98
McA: Metcalf-----	80	Fair Organic matter content low Too acid Water erosion	 0.12 0.50 0.68	Poor Low strength Wetness depth Shrink-swell	 0.00 0.53 0.90	Fair Wetness depth Too acid	 0.53 0.76
MeA: Metcalf-----	45	Fair Organic matter content low Too acid Water erosion	 0.12 0.50 0.68	Poor Low strength Wetness depth Shrink-swell	 0.00 0.53 0.88	Fair Wetness depth Too acid	 0.53 0.76
Sawtown-----	35	Fair Too acid Organic matter content low Water erosion	 0.20 0.88 0.99	Poor Low strength Shrink-swell	 0.00 0.95	Fair Too acid	 0.98
MfA: Metcalf-----	55	Fair Organic matter content low Too acid Water erosion	 0.12 0.20 0.68	Poor Low strength Wetness depth Shrink-swell	 0.00 0.53 0.93	Fair Wetness depth Too acid	 0.53 0.76

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MfA: Timpson-----	35	Fair Too acid Organic matter content low Water erosion	 0.08 0.88 0.90	Good		Fair Too acid	 0.50
MhC: Meth-----	80	Poor Too clayey Organic matter content low Too acid	 0.00 0.12 0.54	Good		Poor Too clayey Too acid	 0.00 0.98
MpA: Mollville-----	60	Fair Organic matter content low Too acid Sodium content Water erosion	 0.12 0.54 0.90 0.99	Poor Wetness depth Low strength Shrink-swell	 0.00 0.78 0.87	Poor Wetness depth Sodium content Too acid	 0.00 0.90 0.98
Besner-----	35	Fair Too acid Organic matter content low	 0.54 0.88	Good		Fair Too acid	 0.98
Ow: Owentown-----	85	Fair Organic matter content low Too acid Too sandy	 0.68 0.74 0.98	Good		Fair Too sandy	 0.98
Ox: Owentown-----	90	Fair Organic matter content low Too acid Too sandy	 0.68 0.74 0.98	Good		Fair Too sandy	 0.98
RnB: Rentzel-----	70	Poor Too sandy Wind erosion Too acid Organic matter content low	 0.00 0.00 0.50 0.60	Fair Wetness depth	 0.76	Poor Too sandy Wetness depth Too acid	 0.00 0.76 0.88
SaC: Sacul-----	90	Poor Too clayey Too acid Organic matter content low	 0.00 0.12 0.88	Poor Low strength Shrink-swell	 0.00 0.72	Poor Too clayey Too acid	 0.00 0.59

Soil Survey of Shelby County, Texas

Table 15.—Construction Materials, Part II—Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SfA: Sawtown-----	80	Fair Too acid Organic matter content low Water erosion	 0.20 0.88 0.99	Poor Low strength Shrink-swell	 0.00 0.98	Fair Too acid	 0.98
TnB: Tenaha-----	80	Poor Wind erosion Too acid Too sandy Organic matter content low	 0.00 0.08 0.09 0.18	Good		Fair Too sandy Too acid Rock fragments	 0.09 0.98 0.99
TnD: Tenaha-----	80	Poor Wind erosion Too acid Too sandy Organic matter content low	 0.00 0.08 0.09 0.18	Fair Depth to bedrock	 0.92	Fair Too sandy Slope Too acid Rock fragments	 0.09 0.84 0.98 0.99
TnG: Tenaha-----	80	Poor Wind erosion Too acid Organic matter content low	 0.00 0.08 0.18	Poor Slope Depth to bedrock	 0.00 0.50	Poor Slope Too acid	 0.00 0.50
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of Shelby County, Texas

Table 16.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbA: Alazan-----	50	Somewhat limited Seepage	0.70	Very limited Depth to saturated zone Piping	0.99 0.77	Somewhat limited Slow refill Cutbanks cave Depth to saturated zone	0.30 0.10 0.01
Besner-----	40	Very limited Seepage	1.00	Very limited Piping	1.00	Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	0.87 0.30 0.10
AtB: Attoyac-----	95	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.68	Very limited Depth to water	1.00
AuD: Austonio-----	85	Very limited Seepage	1.00	Somewhat limited Piping Seepage	0.72 0.01	Very limited Depth to water	1.00
BaB: Bernaldo-----	90	Somewhat limited Seepage	0.70	Not limited		Very limited Depth to water Slow refill	1.00 0.30
BeA: Besner-----	70	Very limited Seepage	1.00	Somewhat limited Seepage	0.02	Somewhat limited Depth to saturated zone Cutbanks cave	0.87 0.10
BfC: Betis-----	95	Very limited Seepage	1.00	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00
BnA: Bonn-----	60	Somewhat limited Seepage	0.04	Very limited Depth to saturated zone Piping	1.00 0.99	Very limited Depth to water	1.00
Cart-----	40	Somewhat limited Seepage	0.70	Very limited Piping Depth to saturated zone	0.99 0.09	Very limited Depth to water	1.00
BwB: Bowie-----	80	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.27	Very limited Depth to water	1.00

Soil Survey of Shelby County, Texas

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChE: Cuthbert-----	80	Somewhat limited Seepage	0.03	Somewhat limited Piping	0.05	Very limited Depth to water	1.00
CgE: Cuthbert-----	90	Somewhat limited Seepage	0.03	Somewhat limited Piping	0.01	Very limited Depth to water	1.00
CrG: Cuthbert-----	80	Somewhat limited Seepage	0.03	Not limited		Very limited Depth to water	1.00
CsG: Cuthbert-----	90	Somewhat limited Slope Seepage	0.12 0.03	Somewhat limited Piping	0.76	Very limited Depth to water	1.00
CtG: Cuthbert-----	80	Somewhat limited Slope Seepage	0.28 0.03	Somewhat limited Piping	0.03	Very limited Depth to water	1.00
DaC: Darco-----	95	Very limited Seepage	1.00	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00
DaE: Darco-----	90	Very limited Seepage Slope	1.00 0.01	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00
Dr: Dreka-----	80	Somewhat limited Seepage	0.03	Very limited Depth to saturated zone	1.00	Somewhat limited Slow refill Cutbanks cave	0.97 0.10
EeB: Eastwood-----	90	Not limited		Somewhat limited Hard to pack	0.27	Very limited Depth to water	1.00
EeD: Eastwood-----	95	Not limited		Somewhat limited Hard to pack	0.54	Very limited Depth to water	1.00
ElA: Eastwood-----	50	Not limited		Somewhat limited Hard to pack	0.36	Very limited Depth to water	1.00
Latex-----	40	Somewhat limited Seepage	0.70	Somewhat limited Depth to saturated zone	0.02	Very limited Depth to water	1.00
GaA: Gallime-----	48	Very limited Seepage	1.00	Very limited Piping	1.00	Very limited Depth to water	1.00
Guyton-----	42	Not limited		Very limited Depth to saturated zone Piping	1.00 1.00	Very limited Depth to water	1.00

Soil Survey of Shelby County, Texas

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GaB: Gallime-----	90	Very limited Seepage	1.00	Somewhat limited Piping Seepage	0.91 0.01	Very limited Depth to water	1.00
GrB: Grapeland-----	85	Very limited Seepage	1.00	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00
GtA: Guyton-----	90	Not limited		Very limited Ponding Depth to saturated zone Piping	1.00 1.00 0.99	Somewhat limited Slow refill Cutbanks cave	0.30 0.10
HaB: Hainesville-----	90	Very limited Seepage	1.00	Somewhat limited Seepage	0.34	Very limited Depth to water	1.00
Iu: Iulus-----	80	Somewhat limited Seepage	0.70	Very limited Piping Depth to saturated zone Seepage	1.00 0.68 0.02	Very limited Depth to water	1.00
KfC: Kirvin-----	95	Somewhat limited Seepage	0.03	Not limited		Very limited Depth to water	1.00
KgC: Kirvin-----	90	Somewhat limited Seepage	0.03	Not limited		Very limited Depth to water	1.00
KsC: Kirvin-----	95	Somewhat limited Seepage	0.03	Not limited		Very limited Depth to water	1.00
La: Laneville-----	85	Somewhat limited Seepage	0.03	Somewhat limited Depth to saturated zone	0.95	Very limited Depth to water	1.00
Lf: Laneville-----	80	Somewhat limited Seepage	0.70	Somewhat limited Depth to saturated zone	0.95	Very limited Depth to water	1.00
LtB: Latex-----	70	Somewhat limited Seepage	0.70	Somewhat limited Depth to saturated zone Piping	0.02 0.02	Very limited Depth to water	1.00
LuC: Lilbert-----	90	Very limited Seepage	1.00	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00

Soil Survey of Shelby County, Texas

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MaE: Maben-----	90	Somewhat limited Seepage	0.03	Somewhat limited Hard to pack Seepage	0.45 0.01	Very limited Depth to water	1.00
MaG: Maben-----	90	Somewhat limited Slope Seepage	0.28 0.03	Somewhat limited Hard to pack Seepage	0.54 0.01	Very limited Depth to water	1.00
McA: Metcalf-----	80	Somewhat limited Seepage	0.04	Very limited Depth to saturated zone	0.99	Very limited Depth to water	1.00
MeA: Metcalf-----	45	Somewhat limited Seepage	0.04	Very limited Depth to saturated zone	0.99	Very limited Depth to water	1.00
Sawtown-----	35	Very limited Seepage	1.00	Somewhat limited Piping Depth to saturated zone	0.17 0.02	Very limited Depth to water	1.00
MfA: Metcalf-----	55	Somewhat limited Seepage	0.70	Very limited Depth to saturated zone Piping	0.99 0.01	Very limited Depth to water	1.00
Timpson-----	35	Very limited Seepage	1.00	Somewhat limited Piping Depth to saturated zone	0.78 0.46	Very limited Depth to water	1.00
MhC: Meth-----	80	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.54	Very limited Depth to water	1.00
MpA: Mollville-----	60	Not limited		Very limited Ponding Depth to saturated zone Piping Seepage	1.00 1.00 0.80 0.01	Somewhat limited Cutbanks cave	0.10
Besner-----	35	Very limited Seepage	1.00	Not limited		Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	0.87 0.30 0.10
Ow: Owentown-----	85	Somewhat limited Seepage	0.70	Very limited Piping Depth to saturated zone Seepage	1.00 0.24 0.02	Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	0.38 0.30 0.10

Soil Survey of Shelby County, Texas

Table 16.—Water Management—Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ox: Owentown-----	90	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Seepage	0.24 0.02	Somewhat limited Depth to saturated zone Cutbanks cave	0.38 0.10
RnB: Rentzel-----	70	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Seepage	0.95 0.07	Very limited Depth to water	1.00
SaC: Sacul-----	90	Somewhat limited Seepage	0.03	Somewhat limited Depth to saturated zone Piping	0.43 0.01	Very limited Depth to water	1.00
SfA: Sawtown-----	80	Very limited Seepage	1.00	Somewhat limited Piping Depth to saturated zone Seepage	0.35 0.02 0.01	Very limited Depth to water	1.00
TnB: Tenaha-----	80	Very limited Seepage	1.00	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00
TnD: Tenaha-----	80	Very limited Seepage Depth to bedrock	1.00 0.01	Somewhat limited Seepage	0.05	Very limited Depth to water	1.00
TnG: Tenaha-----	80	Very limited Seepage Slope Depth to bedrock	1.00 0.28 0.01	Not limited		Very limited Depth to water	1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Table 17.--Engineering Index Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AbA: Alazan-----	0-11	Very fine sandy loam	CL-ML, ML	A-4	0	0	100	96-100	90-100	51-80	0-25	NP-7
	11-80	Sandy clay loam, loam	CL, ML	A-4, A-6	0	0	100	96-100	90-100	51-85	25-40	8-22
Besner-----	0-7	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	90-100	29-66	0-25	NP-7
	7-24	Fine sandy loam, very fine sandy loam, loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	90-100	29-66	0-25	NP-7
	24-53	Loam, fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	80-100	29-66	0-25	NP-7
	53-80	Sandy clay loam, loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	100	95-100	80-100	36-75	18-30	6-15
AtB: Attoyac-----	0-10	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-4	0	0	98-100	95-100	70-100	40-65	0-23	NP-7
	10-80	Sandy clay loam, fine sandy loam, loam	ML, CL, SC	A-4, A-6	0	0	98-100	95-100	80-100	45-75	23-40	7-24
AuD: Austonio-----	0-16	Fine sandy loam	CL, ML, SC, SM	A-4	0	0	90-100	90-100	85-95	36-55	20-28	3-10
	16-70	Sandy clay loam, loam	CL, SC, CL-ML	A-4, A-2-6, A-6	0	0	100	95-100	90-100	51-75	26-40	12-24
	70-80	Fine sandy loam, loamy fine sand	SC-SM, SM	A-2-4, A-4	0	0	95-100	95-100	85-100	15-45	0-25	NP-5

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
											Pct		
BaB: Bernaldo-----	<u>In</u>											<u>Pct</u>	
	0-5	Fine sandy loam	ML, SM	A-4	0	0	100	95-100	90-100	40-60	0-25	NP-4	
	5-15	Fine sandy loam	SM, ML	A-4	0	0	100	95-100	90-100	40-60	0-25	NP-4	
	15-27	Clay loam, loam, sandy clay loam	CL	A-6	0	0	99-100	98-100	90-100	51-75	26-40	12-24	
	27-80	Sandy clay loam, fine sandy loam, loam	SM, CL, ML, SC	A-2-4, A-4, A-6	0	0	100	95-100	90-100	28-65	20-40	3-22	
BeA: Besner-----	0-13	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	90-100	29-66	0-25	NP-7	
	13-51	Fine sandy loam, very fine sandy loam, loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	90-100	29-66	0-25	NP-7	
	51-80	Fine sandy loam, loam	ML, CL-ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	80-100	29-66	0-25	NP-7	
	0-28	Loamy fine sand	SP-SM, SM, SC-SM	A-2-4, A-2	0	0	100	97-100	90-100	10-35	0-26	NP-6	
	28-80	Loamy fine sand, fine sand	SC-SM, SM	A-2-4, A-2, A-4	0	0	100	97-100	90-100	25-50	16-28	2-10	
BnA: Bonn-----	0-31	Silt loam	CL-ML, ML	A-4	0	0	100	100	95-100	75-100	15-28	NP-7	
	31-56	Clay loam, silt loam, silty clay loam, loam	CL	A-6, A-7-6	0	0	95-100	90-100	85-100	65-100	30-44	12-22	
	56-83	Clay loam, silt loam, silty clay loam, loam	CL	A-4, A-6	0	0	100	95-100	90-100	75-100	28-40	8-18	

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
BnA: Cart-----	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
	0-4	Very fine sandy loam, loam, fine sandy loam	CL, CL-ML, ML A-4		0	0	100	98-100	95-100	51-75	15-30	2-10
	4-17	Very fine sandy loam, loam, fine sandy loam	CL-ML, ML, CL A-4		0	0	100	98-100	95-100	51-75	15-30	2-10
	17-57	Loam, fine sandy loam, very fine sandy loam	CL, CL-ML A-4, A-6		0	0	98-100	95-100	90-100	51-75	18-35	4-12
	57-65	Loam, sandy clay loam, fine sandy loam	CL, CL-ML A-4, A-6		0	0	98-100	95-100	90-100	51-75	20-40	4-18
BwB: Bowie-----	65-80	Clay loam, sandy clay loam, sandy clay	CL, SC A-6, A-7		0	0	98-100	95-100	80-95	40-80	30-42	16-24
	0-17	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	97-100	94-100	90-100	30-55	0-25	NP-6
	17-41	Sandy clay loam, clay loam, fine sandy loam	CL, SC A-4, A-6		0	0	90-100	87-100	80-100	40-72	20-40	8-25
	41-80	Sandy clay loam, clay loam, sandy clay	CL, SC A-6, A-7		0	0	95-100	90-100	75-100	51-80	31-49	14-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number---				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
CbE: Cuthbert-----	0-5	Fine sandy loam	SM, CL-ML, ML, SC-SM	A-2-4, A-4	0	0-1	85-100	78-100	75-98	20-55	0-32	NP-7
	5-20	Clay, sandy clay loam, sandy clay, clay loam	CL, SC, CH	A-6, A-7-6	0	0-1	85-100	75-100	65-100	45-98	37-64	19-40
	20-30	Clay loam, fine sandy loam, sandy clay loam, clay	CL, SC	A-2-6, A-6, A-7	0	0-1	85-100	80-100	75-100	28-84	29-45	11-26
	30-80	Stratified fine sandy loam to clay	CL, SC	A-2-6, A-6, A-7	0	0-3	85-100	80-100	75-100	28-84	21-45	7-26
CgE: Cuthbert-----	0-6	Gravelly fine sandy loam	GC-GM, GM, SC-SM, SM	A-1-b, A-2-4, A-4	0-1	0-5	60-88	50-80	35-75	20-49	0-32	NP-7
	6-31	Clay, sandy clay loam, sandy clay, clay loam	CH, CL, SC	A-6, A-7-6	0	0-1	85-100	75-100	65-100	45-98	37-64	19-40
	31-37	Clay loam, fine sandy loam, sandy clay loam, clay	CL, SC	A-2-6, A-6, A-7	0	0-1	85-100	80-100	75-100	28-84	29-45	11-26
	37-80	Stratified fine sandy loam to clay	CL, SC	A-2-6, A-6, A-7	0	0-3	85-100	80-100	75-100	28-84	21-45	7-26
CrG: Cuthbert-----	0-2	Gravelly clay loam	GC, CL, SC	A-6	0-1	0-5	60-78	50-78	35-70	35-55	30-40	10-18
	2-22	Clay, sandy clay loam, sandy clay, clay loam	CH, CL, SC	A-7-6, A-6	0	0-1	85-100	75-100	65-100	45-98	37-64	20-40
	22-80	Stratified fine sandy loam to very shaly clay	CL, SC	A-2-6, A-6, A-7	0	0-3	85-100	80-100	75-100	28-84	21-45	7-28

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
CsG: Cuthbert-----	0-15	Stony fine sandy loam	SM, SC-SM, ML, CL-ML	A-4	0-1	0-5	90-100	85-100	75-98	36-60	0-30	NP-6
	15-25	Clay loam, sandy clay loam, fine	SC, CL	A-2-6, A-6, A-7	0	0-5	85-100	80-100	75-100	28-84	29-45	11-26
	25-60	sandy loam Stratified fine sandy loam to clay	SC, CL	A-2-6, A-6, A-7	0	0-5	85-100	80-100	75-100	28-84	21-45	7-26
CtG: Cuthbert-----	0-10	Fine sandy loam	SC-SM, CL-ML, ML, SM	A-2-4, A-4	0	0-1	85-100	78-100	75-98	20-55	0-32	NP-7
	10-33	Clay, sandy clay loam, sandy clay, clay loam	CH, CL, SC	A-6, A-7-6	0	0-1	85-100	75-100	65-100	45-98	37-64	19-40
	33-80	Stratified fine sandy loam to clay	SC, CL	A-2-6, A-6, A-7	0	0-3	85-100	80-100	75-100	28-84	21-45	7-26
DaC: Darco-----	0-5	Loamy fine sand	SM, SC-SM	A-2-4	0	0-2	95-100	95-100	75-100	15-30	16-20	NP-3
	5-62	Loamy fine sand, fine sand	SC-SM, SM	A-2-4	0	0-2	95-100	95-100	75-100	15-30	16-20	NP-3
	62-80	Fine sandy loam, sandy clay loam, clay loam	SC, CL, SC-SM	A-2, A-4, A-6	0	0	95-100	95-100	75-100	23-50	20-40	5-18
DaE: Darco-----	0-6	Loamy fine sand	SM	A-2-4	0	0-2	95-100	95-100	75-100	15-30	16-20	NP-3
	6-49	Loamy fine sand, fine sand	SM	A-2-4	0	0-2	95-100	95-100	75-100	15-30	16-20	NP-3
	49-54	Fine sandy loam, sandy clay loam	CL, SC	A-2-4, A-6, A-7-6	0	0	95-100	95-100	80-100	23-55	25-45	9-28
	54-80	Sandy clay loam, fine sandy loam, clay loam	SC, SC-SM	A-2, A-4, A-6	0	0	95-100	95-100	75-100	23-50	20-40	5-18

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200	Pct		
	In				Pct	Pct							
Dr: Dreka-----	0-9	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	70-90		20-40	6-21
	9-30	Clay loam, loam, silty clay loam	CL-ML, CL	A-4, A-6, A-7	0	0	100	95-100	90-100	70-95		20-44	6-25
	30-80	Clay, clay loam, silty clay	CH, CL	A-6, A-7	0	0	100	95-100	90-100	75-98		35-55	20-35
EeB: Eastwood-----	0-10	Very fine sandy loam	CL, SC-SM, ML, CL-ML	A-4, A-6	0	0	98-100	98-100	95-100	40-89		0-31	NP-12
	10-55	Clay, silty clay	CL, CH	A-7-6	0	0	100	95-100	90-100	70-98		50-74	29-48
	55-80	Stratified fine sandy loam to shaly silty clay loam	SC-SM, SC, CL-ML, CL	A-4, A-6, A-7-6	0	0	95-100	95-100	90-100	40-98		27-47	10-25
EeD: Eastwood-----	0-4	Very fine sandy loam	ML, CL, CL-ML	A-4, A-6	0	0	98-100	98-100	95-100	40-89		20-37	3-20
	4-47	Clay, silty clay	SC-SM, CL-ML CL, CH	A-7-6	0	0	100	95-100	90-100	70-98		40-75	25-48
	47-80	Stratified fine sandy loam to shaly silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6, A-7-6	0	0	95-100	95-100	90-100	40-98		25-68	5-44
E1A: Eastwood-----	0-6	Very fine sandy loam	CL, SC-SM, ML, CL-ML	A-4, A-6	0	0	98-100	98-100	95-100	40-89		20-37	3-20
	6-35	Clay, silty clay	CH, CL	A-7-6	0	0	100	95-100	90-100	70-98		40-75	25-48
	35-43	Clay loam, silty clay loam, loam	CL, CH	A-6, A-7-6	0	0	100	95-100	90-100	55-99		35-65	15-45
	43-80	Stratified fine sandy loam to shaly silty clay loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7-6	0	0	95-100	95-100	90-100	40-98		25-68	5-44

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index	
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
E1A: Latex-----	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>		
	0-14	Fine sandy loam	SM, SC-SM, SC, CL-ML	A-4	0	0		99-100	96-100	90-100	45-75	19-30	2-9
	14-31	Loam, clay loam, sandy clay loam	CL, CL-ML	A-4, A-6	0	0		99-100	95-100	90-100	51-80	20-40	6-25
	31-39	Clay loam, loam, sandy clay loam	SC, CL-ML, CL, SC-SM	A-4, A-6	0	0-2		75-100	64-98	62-95	41-80	20-40	6-25
	39-80	Clay, silty clay, clay loam	CH, CL	A-7-6	0	0		99-100	95-100	90-100	75-98	41-70	20-43
GaA: Gallime-----	0-21	Fine sandy loam	CL-ML, SC, ML, SM, CL	A-4	0	0		95-100	95-100	90-100	45-65	15-28	3-10
	21-43	Loam, fine sandy loam, very fine sandy loam	CL-ML, SM, ML, CL, SC	A-4	0	0		95-100	95-100	90-100	45-65	15-28	3-10
	43-80	Sandy clay loam, clay loam, loam	SC, CL, CL-ML	A-4, A-6, A-2-6	0	0		95-100	95-100	90-100	45-80	25-40	8-20
	0-8	Silt loam	ML, CL-ML	A-4	0	0		100	100	95-100	65-90	0-27	NP-7
	8-60	Silty clay loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0		100	100	94-100	75-95	22-40	6-18
Guyton-----	60-80	Sandy clay loam, silt loam, silty clay loam	ML, CL-ML, CL	A-4, A-6	0	0		100	100	95-100	50-95	0-40	NP-18
	0-3	Very fine sandy loam	SC, ML, CL, CL-ML, SM	A-4	0	0		95-100	95-100	90-100	45-65	15-28	3-10
	3-20	Fine sandy loam, very fine sandy loam, loam	SM, SC, ML, CL, CL-ML	A-4	0	0		95-100	95-100	90-100	45-65	15-28	3-10
	20-80	Clay loam, sandy clay loam, loam	SC, CL-ML, CL	A-4, A-6, A-2-6	0	0		95-100	95-100	90-100	45-80	25-40	8-20

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
GrB: Grapeland-----	In										Pct	
	0-6	Loamy fine sand	SC-SM, SM	A-4, A-2-4	0	0	100	98-100	80-100	15-35	0-25	NP-7
	6-80	Loamy fine sand, loamy sand	SC-SM, SM	A-2-4, A-4	0	0	100	98-100	80-100	13-45	0-25	NP-7
GtA: Guyton-----	0-15	Silt loam	CL-ML, ML	A-4	0	0	100	100	95-100	65-90	0-27	NP-7
	15-80	Clay loam, silt loam, silty clay loam	CL-ML, CL	A-7, A-6	0	0	100	100	94-100	75-95	26-40	6-18
HaB: Hainesville-----	0-7	Fine sand	SC-SM, SM, SW-SM	A-2-4	0	0	98-100	95-100	80-100	10-30	0-25	NP-5
	7-80	Loamy fine sand, fine sand	SC-SM, SM	A-2-4, A-4	0	0	98-100	95-100	80-100	13-45	0-25	NP-7
Iu: Iulus-----	0-4	Fine sandy loam, loam, very fine sandy loam	ML, CL-ML	A-4	0	0	95-100	95-100	85-95	51-75	16-25	NP-6
	4-24	Fine sandy loam, loam	SM, SC-SM, ML, CL-ML	A-4	0	0	95-100	85-100	80-95	45-75	16-25	NP-6
	24-80	Fine sandy loam, loam, sandy clay loam	CL, CL-ML, ML, SC	A-4, A-6	0	0	95-100	90-100	80-95	45-75	16-32	3-15
KfC: Kirvin-----	0-12	Fine sandy loam	CL, ML, SC, SM	A-4	0	0-2	95-100	95-98	90-95	36-70	0-30	NP-8
	12-41	Clay, clay loam, sandy clay	CH, CL	A-7	0	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	41-43	Sandy clay loam, fine sandy loam, clay loam, clay	CH, CL	A-6, A-7	0	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	43-80	Stratified fine sandy loam to clay	CH, CL, SC	A-4, A-6, A-7	0	0-1	95-100	90-100	50-90	36-80	25-52	9-32

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
KgC: Kirvin-----	0-9	Gravelly fine sandy loam	GC-GM, GM, SC, SM	A-2-4, A-4	0	0-5	55-92	47-80	40-75	25-49	0-30	NP-8
	9-41	Clay, clay loam, sandy clay	CH, CL	A-7	0	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	41-55	Sandy clay loam, clay loam, clay	CH, CL, SC	A-6, A-7	0	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	55-80	Stratified fine sandy loam to clay	CH, CL, SC	A-4, A-6, A-7	0	0-1	95-100	90-100	50-90	36-80	25-52	9-32
KsC: Kirvin-----	0-6	Clay loam	CH, CL	A-6, A-7	0	0-1	95-100	90-100	85-99	51-80	32-52	16-32
	6-35	Clay loam, sandy clay, clay	CL, CH	A-7	0	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	35-47	Clay loam, sandy clay loam, clay	CL, CH	A-6, A-7	0	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	47-80	Stratified fine sandy loam to clay	SC, CL, CH	A-4, A-6, A-7	0	0-1	95-100	90-100	50-90	36-80	25-52	9-32
La: Laneville-----	0-18	Silt loam	ML, CL-ML, CL	A-4, A-6	0	0	100	95-100	90-100	80-95	18-40	3-20
	18-35	Silty clay loam, clay loam, loam	CL-ML, CL	A-4, A-6	0	0	100	95-100	90-100	85-98	20-40	6-20
	35-80	Clay, clay loam	CH, CL	A-6, A-7	0	0	100	95-100	90-100	85-98	35-55	20-35
Lf: Laneville-----	0-24	Loam	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	90-100	80-95	18-40	3-20
	24-35	Clay loam, loam, silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	95-100	90-100	85-98	20-40	6-20
	35-80	Clay, clay loam	CH, CL	A-6, A-7, A-7-6	0	0	100	95-100	90-100	85-98	35-55	20-35

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
LtB: Latex-----	In				Pct	Pct					Pct		
	0-11	Fine sandy loam	CL-ML, SC, SM, ML, SC-SM	A-4	0	0	99-100	96-100	90-100	45-75	19-30	2-9	
	11-22	Loam, clay loam, sandy clay loam	CL, CL-ML	A-4, A-6	0	0	99-100	95-100	90-100	51-80	20-40	6-25	
	22-55	Loam, clay loam, sandy clay loam	CL, SC-SM, SC, CL-ML	A-4, A-6	0	0-2	75-100	64-98	62-95	41-80	20-40	6-25	
	55-80	Clay, silty clay, clay loam	CH, CL	A-7-6	0	0	99-100	95-100	90-100	75-98	41-70	20-43	
LuC: Libert-----	0-6	Loamy fine sand	SM, SC-SM	A-2-4, A-4	0	0	95-100	95-100	80-100	17-40	0-20	NP-3	
	6-31	Loamy fine sand	SM, SC-SM	A-2-4, A-4	0	0	95-100	95-100	80-100	17-40	0-20	NP-3	
	31-39	Sandy clay loam, fine sandy loam	SC, CL	A-4, A-6	0	0	95-100	95-100	85-100	36-55	23-39	8-22	
	39-80	Sandy clay loam, fine sandy loam, clay loam	CL, SC	A-4, A-6	0	0	90-100	90-100	85-100	35-75	22-39	8-20	
MaE: Maben-----	0-4	Fine sandy loam	SC-SM, SM	A-4	0	0	95-100	90-100	70-85	36-50	17-33	2-13	
	4-28	Clay loam, clay, silty clay	MH	A-7	0	0	90-100	90-100	90-100	75-95	45-64	25-40	
MaG: Maben-----	0-3	Fine sandy loam	SC-SM, SM	A-4	0	0	95-100	90-100	70-85	36-50	17-33	2-13	
	3-30	Silty clay, clay, clay loam	MH	A-7	0	0	90-100	90-100	90-100	75-95	45-64	25-40	

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
											Pct		
McA: Metcalf-----	In											Pct	
	0-10	Very fine sandy loam	CL-ML, ML	A-4	0	0	100	100	90-100	65-90	19-36	3-15	
	10-36	Clay loam, silt loam, loam	CL	A-6	0	0	100	100	90-100	65-95	27-38	12-19	
	36-80	Clay, silty clay, clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	49-69	29-44	
MeA: Metcalf-----	0-7	Very fine sandy loam	ML, CL-ML	A-4	0	0	100	100	90-100	65-90	15-25	NP-6	
	7-35	Loam, silt loam, clay loam	CL	A-6	0	0	100	100	90-100	65-95	31-40	11-18	
	35-80	Clay, silty clay, clay loam	CL, CH	A-7-6	0	0	100	100	95-100	85-100	46-66	20-38	
	0-30	Very fine sandy loam, fine sandy loam, loam	SM, SC-SM, ML, CL-ML	A-4	0	0	95-100	95-100	85-100	45-80	0-25	NP-6	
MfA: Metcalf-----	30-49	Loam, sandy clay loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	90-100	55-85	24-40	6-22	
	49-80	Clay loam, clay	CL, CH	A-6, A-7-6	0	0	95-100	95-100	90-100	65-95	39-65	20-45	
	0-11 11-37	Silt loam Loam, silt loam, clay loam	CL-ML, ML CL	A-4 A-6	0 0	0	100 100	100 100	90-100 90-100	65-90 65-95	19-36 27-38	3-15 12-19	
	37-65 65-80	Clay, silty clay, clay loam Loam, fine sandy loam	CH, CL ML, CL-ML, SM, SC-SM	A-7-6 A-4, A-6	0 0	0	100 98-100	100 95-100	95-100 80-100	85-100 40-70	49-69 16-31	29-44 2-12	

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index	
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>		
MfA: Timpson-----													
	0-7	Silt loam	ML, CL-ML	A-4	0	0	0	97-100	95-100	88-96	59-82	0-30	NP-7
	7-21	Very fine sandy loam, silt loam, loam	SM, CL-ML, ML	A-4	0	0	0	97-100	95-100	88-96	43-82	0-26	NP-7
	21-53	Loam, silt loam	ML, CL, SM, CL-ML	A-4	0	0	0	97-100	95-100	85-98	48-86	21-31	6-12
	53-74	Clay loam, silty clay loam, clay	CH, CL	A-6, A-7-6	0	0	0	97-100	95-100	87-100	63-96	40-60	21-36
MhC: Meth-----	74-80	Sandy clay loam, clay loam, silty clay loam	SC, CL	A-4, A-7-6, A-6	0	0	0	97-100	95-100	85-99	47-92	32-51	13-29
	0-8	Fine sandy loam	SC-SM, ML, CL-ML, SM	A-4	0	0	0	98-100	85-100	65-100	40-75	0-25	NP-5
	8-30	Clay, sandy clay, clay loam	SC, CH, CL	A-6, A-7-5, A-7-6	0	0	0	100	100	85-100	45-95	36-66	14-34
	30-85	Sandy clay loam, sandy loam, fine sandy loam	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7-6	0	0	0	100	100	75-100	40-60	25-45	5-21
MpA: Mollville-----	0-9	Loam	CL, CL-ML, ML	A-4, A-6	0	0	0	100	100	85-100	50-80	20-35	3-15
	9-57	Clay loam, sandy clay loam, loam	CL, SC	A-4, A-6	0	0	0	100	100	90-100	45-75	25-40	8-22
	57-76	Loam, clay loam, sandy clay loam	CL, SC	A-6	0	0	0	100	100	90-100	45-80	30-40	11-20
	76-80	Fine sandy loam, loamy fine sand	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	0	95-100	95-100	70-95	15-68	0-25	NP-6

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
MpA: Besner-----	0-7	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	90-100	29-66	0-25	NP-7
	7-46	Fine sandy loam, very fine sandy loam, loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	90-100	29-66	0-25	NP-7
	46-80	Loam, fine sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	80-100	29-66	0-25	NP-7
Ow: Owentown-----	0-3	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-4, A-2-4	0	0	100	95-100	80-100	36-66	17-31	3-12
	3-80	Fine sandy loam, loam	CL-ML, ML, SC-SM, SM	A-4, A-2-4	0	0	100	95-100	80-100	36-66	17-31	3-12
Ox: Owentown-----	0-6	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	95-100	80-100	36-66	17-31	3-12
	6-45	Fine sandy loam, loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	95-100	80-100	36-66	17-31	3-12
	45-80	Fine sandy loam, loamy fine sand, loam	SC, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	80-100	20-49	16-26	2-7
RnB: Rentzel-----	0-24	Loamy fine sand	SM	A-2-4, A-4	0	0	97-100	95-100	75-98	15-40	0-30	NP-4
	24-80	Sandy clay loam, fine sandy loam	SC-SM, SC, CL-ML, CL	A-4, A-6, A-7	0	0	95-100	90-100	75-98	36-55	20-43	4-22
SaC: Sacul-----	0-12	Fine sandy loam	SC-SM, SM	A-2, A-4	0	0	75-100	75-100	45-85	25-50	15-25	NP-7
	12-43	Clay, silty clay, clay loam	SC, CL, CH	A-7	0	0	85-100	85-100	70-100	40-95	45-70	20-40
	43-80	Clay loam, silty clay loam, loam	SC, CL	A-2, A-4, A-6, A-7	0	0	85-100	85-100	65-100	30-95	25-48	8-25

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index	
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
SfA: Sawtown-----	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>		
	0-4	Very fine sandy loam	SM, SC-SM, ML	A-4	0	0	0	95-100	95-100	85-100	45-75	0-25	NP-4
	4-30	Fine sandy loam, very fine sandy loam, loam	SC-SM, SM, CL-ML, ML	A-4	0	0	0	95-100	95-100	85-100	45-80	0-25	NP-6
	30-54	Clay loam, loam, sandy loam, sandy clay loam	CL-ML, CL	A-4, A-6	0	0	0	95-100	95-100	90-100	55-85	24-40	6-22
	54-80	Clay, clay loam	CL, CH	A-6, A-7-6	0	0	0	95-100	95-100	90-100	65-95	39-65	20-45
TnB: Tenaha-----	0-3	Loamy fine sand	SM, SC-SM	A-2-4, A-4	0	0	0	95-100	78-100	70-95	15-40	16-20	NP-4
	3-31	Loamy fine sand	SM, SC-SM	A-2-4, A-4	0	0	0	95-100	78-100	70-95	15-40	16-20	NP-4
	31-46	Sandy clay loam, fine sandy loam, clay loam	SC, CL	A-4, A-6, A-7-6	0	0	0	95-100	95-100	80-100	36-66	25-46	8-26
	46-80	Stratified fine sandy loam to clay	SC, CL	A-2-6, A-6, A-7	0-1	0-3	0-3	89-100	85-100	80-100	28-84	25-45	11-26
TnD: Tenaha-----	0-2	Loamy fine sand	SM, SC-SM	A-2-4, A-4	0	0	0	95-100	78-100	70-95	15-40	16-20	NP-4
	2-29	Loamy fine sand	SC-SM, SM	A-2-4, A-4	0	0	0	95-100	78-100	70-95	15-40	16-20	NP-4
	29-55	Sandy clay loam, fine sandy loam, clay loam	SC, CL	A-4, A-6, A-7-6	0	0	0	95-100	95-100	80-100	36-66	25-46	8-26
	55-80	Stratified fine sandy loam to clay	SC, CL	A-2-6, A-6, A-7	0-1	0-3	0-3	89-100	85-100	80-100	28-84	25-45	11-26
TnG: Tenaha-----	0-3	Loamy fine sand	SC-SM, SM	A-2-4, A-4	0	0	0	95-100	78-100	70-95	15-40	0-28	NP-10
	3-21	Loamy fine sand	SC-SM, SM	A-2-4, A-4	0	0	0	95-100	78-100	70-95	15-40	0-27	NP-10
	21-43	Sandy clay loam, fine sandy loam, clay loam	SC, CL	A-4, A-6, A-7-6	0	0	0	95-100	95-100	80-100	36-66	29-44	13-25
	43-80	Stratified fine sandy loam to clay	CL, SC	A-2-6, A-6, A-7	0-1	0-3	0-3	89-100	85-100	80-100	28-84	29-49	13-28

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
W. Water	In				Pct	Pct					Pct		

Table 18.—Physical Soil Properties

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	Pct	Pct					
AbA:												
Alazan-----	0-11	5-15	1.40-1.65	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.32	.37	5	3	86
	11-80	18-25	1.45-1.70	4.00-14.00	0.12-0.18	0.0-2.9	0.1-1.0	.28	.37			
Besner-----	0-7	4-15	1.20-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.24	.24	5	3	86
	7-24	4-17	1.20-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24			
	24-53	8-18	1.30-1.50	4.00-14.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
	53-80	10-25	1.30-1.50	4.00-14.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
AtB:												
Attoyac-----	0-10	8-20	1.30-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.5-1.0	.28	.28	5	3	86
	10-80	18-32	1.40-1.65	4.00-14.00	0.13-0.18	0.0-2.9	0.5-1.0	.32	.32			
AuD:												
Austonio-----	0-16	5-15	1.25-1.40	14.00-42.00	0.11-0.15	0.0-2.9	0.5-2.0	.20	.20	5	3	86
	16-70	18-30	1.35-1.60	4.00-14.00	0.12-0.16	3.0-5.9	0.1-1.0	.32	.32			
	70-80	3-15	1.45-1.65	14.00-42.00	0.07-0.12	0.0-2.9	0.1-1.0	.20	.20			
BaB:												
Bernaldo-----	0-5	3-15	1.30-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.28	.28	5	3	86
	5-15	3-15	1.30-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.28	.28			
	15-27	15-30	1.40-1.65	4.00-14.00	0.13-0.18	3.0-5.9	0.1-1.0	.32	.32			
	27-80	10-30	1.45-1.65	4.00-14.00	0.13-0.18	0.0-2.9	0.1-1.0	.32	.32			
BeA:												
Besner-----	0-13	4-15	1.20-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.24	.24	5	3	86
	13-51	4-17	1.20-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24			
	51-80	8-18	1.30-1.50	4.00-14.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
BfC:												
Betis-----	0-28	2-10	1.20-1.50	42.00-141.00	0.05-0.10	0.0-2.9	0.5-2.0	.17	.17	5	2	134
	28-80	5-15	1.20-1.50	42.00-141.00	0.08-0.11	0.0-2.9	0.1-1.0	.17	.17			
BnA:												
Bonn-----	0-31	5-18	1.30-1.50	1.41-4.23	0.15-0.23	0.0-2.9	0.5-2.0	.49	.49	3	5	56
	31-56	18-35	1.40-1.75	0.00-0.42	0.08-0.14	0.0-2.9	---	.49	.49			
	56-83	15-35	1.40-1.75	0.00-1.41	0.08-0.14	0.0-2.9	---	.49	.49			

Table 18.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	Pct	Pct					
BnA: Cart-----	0-4	2-14	1.40-1.65	14.00-42.00	0.11-0.17	0.0-2.9	0.5-1.0	.49	.49	4	3	86
	4-17	2-14	1.40-1.65	14.00-42.00	0.11-0.17	0.0-2.9	0.5-1.0	.49	.49			
	17-57	10-18	1.50-1.70	4.00-14.00	0.11-0.17	0.0-2.9	0.5-1.0	.43	.43			
	57-65	15-26	1.60-1.90	0.42-1.40	0.05-0.11	0.0-2.9	0.5-1.0	.37	.37			
	65-80	27-39	1.50-1.85	1.40-4.00	0.14-0.18	3.0-5.9	0.5-1.0	.32	.32			
BwB: Bowie-----	0-17	3-15	1.40-1.69	14.00-42.00	0.10-0.15	0.0-2.9	0.5-1.0	.32	.32	5	3	86
	17-41	18-35	1.60-1.69	4.00-14.00	0.10-0.16	0.0-2.9	0.1-1.0	.32	.32			
	41-80	25-40	1.65-1.80	1.40-4.00	0.10-0.16	3.0-5.9	0.1-1.0	.32	.32			
CbE: Cuthbert-----	0-5	2-15	1.20-1.40	14.00-42.00	0.09-0.12	0.0-2.9	0.5-2.0	.28	.37	3	3	86
	5-20	35-60	1.24-1.45	1.40-4.00	0.10-0.15	3.0-5.9	0.1-1.0	.32	.32			
	20-30	20-50	1.35-1.60	1.40-4.00	0.08-0.14	3.0-5.9	0.1-0.5	.32	.32			
	30-80	20-45	1.40-1.65	0.42-4.00	0.08-0.14	3.0-5.9	0.1-0.5	.32	.32			
CgE: Cuthbert-----	0-6	2-15	1.20-1.40	14.00-42.00	0.07-0.11	0.0-2.9	0.5-2.0	.20	.28	3	8	0
	6-31	35-60	1.24-1.45	1.40-4.00	0.10-0.15	3.0-5.9	0.1-1.0	.32	.32			
	31-37	20-50	1.35-1.60	1.40-4.00	0.08-0.14	3.0-5.9	0.1-0.5	.32	.32			
	37-80	20-45	1.40-1.65	0.42-4.00	0.08-0.14	3.0-5.9	0.1-0.5	.32	.32			
CrG: Cuthbert-----	0-2	25-40	1.20-1.40	1.40-4.00	0.09-0.12	3.0-5.9	0.5-1.0	.28	.32	3	8	0
	2-22	35-60	1.20-1.45	1.40-4.00	0.10-0.15	3.0-5.9	0.5-1.0	.32	.32			
	22-80	20-45	1.40-1.65	0.42-4.00	0.08-0.15	3.0-5.9	0.0-0.5	.32	.32			
CsG: Cuthbert-----	0-15	2-15	1.45-1.60	14.00-42.00	0.07-0.11	0.0-2.9	0.5-2.0	.28	.28	3	8	0
	15-25	20-50	1.35-1.60	1.40-4.00	0.08-0.14	3.0-5.9	0.1-0.5	.32	.32			
	25-60	20-45	1.40-1.65	0.42-4.00	0.08-0.14	3.0-5.9	0.5-1.0	.32	.32			
CtG: Cuthbert-----	0-10	2-15	1.20-1.40	14.00-42.00	0.09-0.12	0.0-2.9	0.5-2.0	.28	.37	3	3	86
	10-33	35-60	1.24-1.45	1.40-4.00	0.10-0.15	3.0-5.9	0.1-1.0	.32	.32			
	33-80	20-45	1.40-1.65	0.42-4.00	0.08-0.14	3.0-5.9	0.1-0.5	.32	.32			
DaC: Darco-----	0-5	3-15	1.35-1.55	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.17	5	2	134
	5-62	3-15	1.60-1.85	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.17			
	62-80	12-35	1.40-1.65	4.00-14.00	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24			

Table 18.—Physical Soil Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<u>In</u>	<u>Pct</u>	<u>g/cc</u>	<u>um/sec</u>	<u>In/in</u>	<u>Pct</u>	<u>Pct</u>					
DaE: Darco-----	0-6	3-15	1.35-1.55	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.17	5	2	134
	6-49	3-15	1.60-1.85	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.17			
	49-54	12-35	1.40-1.65	4.00-14.00	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24			
	54-80	12-35	1.40-1.65	4.00-14.00	0.10-0.15	0.0-2.9	0.5-1.0	.24	.24			
Dr: Dreka-----	0-9	10-30	1.25-1.35	4.00-14.00	0.12-0.18	0.0-2.9	0.5-2.0	.37	.37	5	6	48
	9-30	18-35	1.30-1.45	1.40-4.00	0.12-0.18	3.0-5.9	0.5-1.0	.32	.32			
	30-80	35-50	1.35-1.55	0.42-1.40	0.12-0.18	6.0-8.9	0.5-1.0	.32	.32			
EeB: Eastwood-----	0-10	3-18	1.20-1.60	4.00-14.00	0.13-0.20	0.0-2.9	0.5-1.0	.49	.49	4	3	86
	10-55	40-65	1.20-1.45	0.01-0.42	0.12-0.18	6.0-8.9	0.5-1.0	.32	.32			
	55-80	15-35	1.35-1.65	0.42-1.40	0.10-0.15	3.0-5.9	0.5-1.0	.37	.37			
EeD: Eastwood-----	0-4	3-18	1.20-1.60	4.00-14.00	0.13-0.20	0.0-2.9	0.5-1.0	.49	.49	4	3	86
	4-47	40-65	1.20-1.45	0.01-0.42	0.12-0.18	6.0-8.9	0.5-1.0	.32	.32			
	47-80	15-35	1.35-1.65	0.42-1.40	0.10-0.15	3.0-5.9	0.5-1.0	.37	.37			
E1A: Eastwood-----	0-6	3-18	1.20-1.60	4.00-14.00	0.13-0.20	0.0-2.9	0.5-1.0	.49	.49	4	3	86
	6-35	40-65	1.20-1.45	0.01-0.42	0.12-0.18	6.0-8.9	0.5-1.0	.32	.32			
	35-43	25-40	1.20-1.50	0.42-1.40	0.12-0.20	6.0-8.9	0.5-1.0	.32	.32			
	43-80	15-35	1.35-1.65	0.42-1.40	0.10-0.15	3.0-5.9	0.5-1.0	.37	.37			
Latex-----	0-14	2-18	1.28-1.45	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.37	.37	5	3	86
	14-31	18-35	1.28-1.45	4.00-14.00	0.11-0.18	3.0-5.9	0.1-1.0	.32	.32			
	31-39	18-35	1.30-1.45	4.00-14.00	0.13-0.18	3.0-5.9	0.1-1.0	.32	.32			
	39-80	35-55	1.30-1.65	0.42-1.40	0.12-0.17	6.0-8.9	0.1-1.0	.32	.32			
GaA: Gallime-----	0-21	10-20	1.30-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.32	.32	5	3	86
	21-43	10-20	1.35-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.3-1.0	.32	.32			
	43-80	18-35	1.40-1.65	4.00-14.00	0.13-0.18	3.0-5.9	0.1-1.0	.32	.32			
Guyton-----	0-8	7-25	1.35-1.65	4.00-14.00	0.20-0.23	0.0-2.9	0.5-4.0	.43	.43	5	5	56
	8-60	20-35	1.35-1.70	0.42-1.40	0.15-0.22	0.0-2.9	0.5-1.0	.37	.37			
	60-80	20-35	1.35-1.70	0.42-1.40	0.15-0.22	0.0-2.9	0.5-1.0	.37	.37			

Table 18.—Physical Soil Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind index
								Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	Pct	Pct					
GaB: Gallime-----	0-3	10-20	1.30-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.32	.32	5	3	86
	3-20	10-20	1.35-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.3-1.0	.32	.32			
	20-80	18-35	1.40-1.65	4.00-14.00	0.13-0.18	3.0-5.9	0.1-1.0	.32	.32			
GrB: Grapeland-----	0-6	3-8	1.35-1.50	42.00-141.00	0.05-0.10	0.0-2.9	0.5-2.0	.20	.20	5	2	134
	6-80	6-12	1.35-1.65	42.00-141.00	0.05-0.12	0.0-2.9	0.1-0.5	.20	.20			
GtA: Guyton-----	0-15	7-25	1.35-1.65	4.00-14.00	0.20-0.23	0.0-2.9	0.5-3.0	.43	.43	5	5	56
	15-80	20-35	1.35-1.65	0.42-1.40	0.15-0.22	0.0-2.9	0.5-1.0	.37	.37			
HaB: Hainesville-----	0-7	1-4	1.50-1.70	42.00-141.00	0.04-0.07	0.0-2.9	0.5-2.0	.17	.17	5	1	220
	7-80	2-10	1.50-1.70	42.00-141.00	0.04-0.10	0.0-2.9	0.5-1.0	.20	.20			
Iu: Iulus-----	0-4	6-15	1.20-1.40	4.00-14.00	0.11-0.18	0.0-2.9	0.5-2.0	.37	.37	5	5	56
	4-24	6-20	1.26-1.45	4.00-14.00	0.11-0.18	0.0-2.9	0.1-1.0	.32	.32			
	24-80	10-28	1.30-1.50	4.00-14.00	0.11-0.18	0.0-2.9	0.1-1.0	.32	.32			
KfC: Kirvin-----	0-12	2-15	1.20-1.40	14.00-42.00	0.09-0.12	0.0-2.9	0.5-2.0	.37	.37	4	3	86
	12-41	35-60	1.24-1.45	1.40-4.00	0.11-0.15	3.0-5.9	0.1-1.0	.32	.32			
	41-43	18-50	1.35-1.60	1.40-4.00	0.11-0.15	3.0-5.9	0.1-1.0	.32	.32			
	43-80	20-45	1.40-1.65	1.40-4.00	0.08-0.14	3.0-5.9	0.1-1.0	.32	.32			
KgC: Kirvin-----	0-9	2-15	1.20-1.40	14.00-42.00	0.07-0.11	0.0-2.9	0.5-2.0	.20	.37	4	8	0
	9-41	35-60	1.24-1.45	1.40-4.00	0.11-0.15	3.0-5.9	0.1-1.0	.32	.32			
	41-55	25-50	1.35-1.60	1.40-4.00	0.11-0.15	3.0-5.9	0.1-1.0	.32	.32			
	55-80	20-45	1.40-1.65	1.40-4.00	0.08-0.14	3.0-5.9	0.1-1.0	.32	.32			
KsC: Kirvin-----	0-6	20-40	1.20-1.40	1.40-4.00	0.12-0.15	3.0-5.9	0.5-1.0	.32	.32	4	3	86
	6-35	35-60	1.24-1.45	1.40-4.00	0.11-0.15	3.0-5.9	0.1-1.0	.32	.32			
	35-47	25-50	1.35-1.60	1.40-4.00	0.11-0.15	3.0-5.9	0.1-1.0	.32	.32			
	47-80	20-45	1.40-1.65	1.40-4.00	0.08-0.14	3.0-5.9	0.1-1.0	.32	.32			
La: Laneville-----	0-18	10-26	1.25-1.35	4.00-14.00	0.11-0.16	0.0-2.9	1.0-3.0	.37	.37	5	5	56
	18-35	18-35	1.30-1.45	1.40-4.00	0.12-0.18	3.0-5.9	0.1-1.0	.32	.32			
	35-80	35-50	1.40-1.55	0.42-1.40	0.12-0.18	6.0-8.9	0.1-1.0	.32	.32			

Table 18.—Physical Soil Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind index
								Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	Pct	Pct					
Lf: Laneville-----	0-24	10-26	1.25-1.35	4.00-14.00	0.11-0.16	0.0-2.9	1.0-3.0	.37	.37	5	5	56
	24-35	18-35	1.30-1.45	1.40-4.00	0.12-0.18	3.0-5.9	0.1-1.0	.32	.32			
	35-80	35-50	1.40-1.55	0.42-1.40	0.12-0.18	6.0-8.9	0.1-1.0	.32	.32			
LtB: Latex-----	0-11	2-18	1.28-1.45	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.37	.37	5	3	86
	11-22	18-35	1.28-1.45	4.00-14.00	0.11-0.18	3.0-5.9	0.1-1.0	.32	.32			
	22-55	18-35	1.30-1.45	4.00-14.00	0.13-0.18	3.0-5.9	0.1-1.0	.32	.32			
	55-80	35-55	1.30-1.65	0.42-1.40	0.12-0.17	6.0-8.9	0.1-1.0	.32	.32			
LuC: Lilbert-----	0-6	3-15	1.50-1.60	42.00-141.00	0.05-0.10	0.0-2.9	0.5-2.0	.20	.20	5	2	134
	6-31	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.2-1.0	.20	.20			
	31-39	16-35	1.55-1.69	4.00-14.00	0.10-0.15	0.0-2.9	0.2-1.0	.24	.24			
	39-80	16-38	1.60-1.75	1.40-4.00	0.10-0.15	0.0-2.9	0.2-1.0	.24	.24			
MaE: Maben-----	0-4	5-20	1.40-1.50	4.00-14.00	0.12-0.16	0.0-2.9	0.5-1.0	.28	.28	3	3	86
	4-28	35-55	1.45-1.55	1.40-4.00	0.14-0.18	6.0-8.9	---	.28	.28			
MaG: Maben-----	0-3	5-20	1.40-1.50	4.00-14.00	0.12-0.16	0.0-2.9	0.5-1.0	.28	.28	3	3	86
	3-30	35-55	1.45-1.55	1.40-4.00	0.14-0.18	6.0-8.9	---	.28	.28			
McA: Metcalf-----	0-10	7-22	1.35-1.65	4.23-14.11	0.12-0.18	0.0-2.9	0.5-2.0	.49	.49	5	5	56
	10-36	18-27	1.35-1.65	1.41-4.23	0.15-0.20	0.0-2.9	0.0-0.5	.37	.37			
	36-80	40-60	1.20-1.60	0.00-0.42	0.15-0.18	6.0-8.9	0.0-0.5	.32	.32			
MeA: Metcalf-----	0-7	7-22	1.35-1.65	4.23-14.11	0.12-0.18	0.0-2.9	0.5-2.0	.49	.49	5	5	56
	7-35	18-27	1.35-1.65	1.41-4.23	0.15-0.20	0.0-2.9	0.0-0.5	.37	.37			
	35-80	40-60	1.20-1.60	0.00-0.42	0.15-0.18	6.0-8.9	0.0-0.5	.32	.32			
Sawtown-----	0-30	4-12	1.35-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.5-1.0	.37	.37	5	5	56
	30-49	15-30	1.30-1.55	4.00-14.00	0.11-0.16	3.0-5.9	0.5-1.0	.32	.32			
	49-80	35-50	1.20-1.45	0.01-0.42	0.12-0.17	6.0-8.9	0.5-1.0	.32	.32			

Table 18.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind index
								Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	Pct	Pct					
MfA: Metcalf-----	0-11	7-22	1.35-1.65	4.23-14.11	0.12-0.18	0.0-2.9	0.5-2.0	.49	.49	5	5	56
	11-37	18-27	1.35-1.65	1.41-4.23	0.15-0.20	0.0-2.9	0.0-0.5	.37	.37			
	37-65	40-60	1.20-1.60	0.00-0.42	0.15-0.18	6.0-8.9	0.0-0.5	.32	.32			
	65-80	5-18	1.35-1.60	4.00-14.00	0.12-0.16	0.0-2.9	0.1-1.0	.32	.32			
Timpson-----	0-7	2-12	1.20-1.50	14.11-42.33	0.15-0.22	0.0-2.9	0.5-3.0	.43	.43	5	5	86
	7-21	2-12	1.30-1.60	14.11-42.33	0.11-0.18	0.0-2.9	0.5-1.0	.43	.43			
	21-53	10-18	1.30-1.70	14.11-42.33	0.15-0.22	0.0-2.9	0.5-1.0	.43	.43			
	53-74	30-50	1.30-1.70	1.41-4.23	0.12-0.18	3.0-5.9	0.5-1.0	.28	.28			
	74-80	20-40	1.30-1.65	1.41-4.23	0.15-0.20	3.0-5.9	0.5-1.0	.37	.37			
MnC: Meth-----	0-8	5-20	1.30-1.60	4.00-14.00	0.12-0.18	0.0-2.9	0.5-2.0	.32	.32	5	3	86
	8-30	35-55	1.20-1.65	1.40-4.00	0.15-0.18	3.0-5.9	0.0-0.5	.28	.28			
	30-85	10-35	1.30-1.70	4.00-14.00	0.12-0.18	0.0-2.9	0.0-0.5	.32	---			
MpA: Mollville-----	0-9	16-20	1.40-1.65	1.41-4.23	0.15-0.20	0.0-2.9	0.5-1.0	.37	.37	5	5	56
	9-57	20-35	1.50-1.69	0.42-1.41	0.12-0.17	3.0-5.9	0.0-0.5	.32	.32			
	57-76	15-35	1.50-1.69	0.42-1.41	0.15-0.20	3.0-5.9	0.0-0.5	.32	.32			
	76-80	3-12	1.50-1.65	14.11-42.34	0.07-0.11	0.0-2.9	0.0-0.5	.20	.20			
Besner-----	0-7	4-15	1.20-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-2.0	.24	.24	5	3	86
	7-46	4-17	1.20-1.40	14.00-42.00	0.11-0.16	0.0-2.9	0.5-1.0	.24	.24			
	46-80	8-18	1.30-1.50	4.00-14.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32			
Ow: Owentown-----	0-3	6-18	1.35-1.55	4.00-14.00	0.11-0.16	0.0-2.9	0.2-1.0	.32	.32	5	3	86
	3-80	6-18	1.40-1.65	4.00-14.00	0.11-0.16	0.0-2.9	0.2-1.0	.32	.32			
Ox: Owentown-----	0-6	6-18	1.35-1.55	4.00-14.00	0.11-0.16	0.0-2.9	0.2-1.0	.32	.32	5	3	86
	6-45	6-18	1.40-1.65	4.00-14.00	0.11-0.16	0.0-2.9	0.2-1.0	.32	.32			
	45-80	5-12	1.40-1.70	14.00-42.00	0.07-0.16	0.0-2.9	0.2-1.0	.28	.28			
RnB: Rentzel-----	0-24	5-10	1.25-1.35	42.00-141.00	0.05-0.09	0.0-2.9	0.1-2.0	.17	.17	5	2	134
	24-80	15-35	1.40-1.75	1.40-4.00	0.10-0.15	0.0-2.9	0.1-1.0	.32	.32			
SaC: Sacul-----	0-12	5-20	1.30-1.50	4.00-14.00	0.09-0.12	0.0-2.9	1.0-3.0	.28	.28	5	3	86
	12-43	35-60	1.25-1.40	0.42-1.40	0.15-0.18	6.0-8.9	0.5-1.0	.32	.32			
	43-80	15-40	1.30-1.45	1.40-4.00	0.14-0.18	0.0-2.9	0.5-2.0	.28	.37			

Table 18.—Physical Soil Properties—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	um/sec	In/in	Pct	Pct					
SfA:												
Sawtown-----	0-4	4-10	1.35-1.50	14.00-42.00	0.10-0.16	0.0-2.9	0.5-2.0	.37	.37	5	3	86
	4-30	4-12	1.35-1.50	14.00-42.00	0.11-0.16	0.0-2.9	0.5-1.0	.37	.37			
	30-54	15-30	1.30-1.55	4.00-14.00	0.11-0.16	3.0-5.9	0.5-1.0	.32	.32			
	54-80	35-50	1.20-1.45	0.01-0.42	0.12-0.17	6.0-8.9	0.5-1.0	.32	.32			
TnB:												
Tenaha-----	0-3	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.24	3	2	134
	3-31	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.1-0.5	.24	.24			
	31-46	20-35	1.50-1.65	4.00-14.00	0.10-0.15	0.0-2.9	0.1-0.5	.32	.32			
	46-80	20-40	1.60-1.75	1.40-4.00	0.08-0.14	0.0-2.9	0.1-0.5	.32	.32			
TnD:												
Tenaha-----	0-2	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.24	3	2	134
	2-29	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.1-0.5	.24	.24			
	29-55	20-35	1.50-1.65	4.00-14.00	0.10-0.15	0.0-2.9	0.1-0.5	.32	.32			
	55-80	20-40	1.60-1.75	1.40-4.00	0.08-0.14	0.0-2.9	0.1-0.5	.32	.32			
TnG:												
Tenaha-----	0-3	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.5-1.0	.17	.24	3	2	134
	3-21	3-15	1.50-1.65	42.00-141.00	0.05-0.10	0.0-2.9	0.1-0.5	.24	.24			
	21-43	20-35	1.50-1.65	4.00-14.00	0.10-0.15	0.0-2.9	0.1-0.5	.32	.32			
	43-80	20-40	1.60-1.75	1.40-4.00	0.08-0.14	0.0-2.9	0.1-0.5	.32	.32			
W.												
Water												

Soil Survey of Shelby County, Texas

Table 19.—Chemical Soil Properties

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
AbA:								
Alazan-----	0-11	---	2.0-10	4.5-6.0	0	0	0.0-2.0	0
	11-80	5.0-15	---	4.5-6.5	0	0	0.0-2.0	0
Besner-----	0-7	2.0-5.0	---	4.1-6.5	0	0	0	0
	7-24	2.0-5.0	---	4.1-6.5	0	0	0	0
	24-53	3.0-10	---	4.1-6.5	0	0	0	0
	53-80	3.0-10	---	4.1-6.5	0	0	0	0
AtB:								
Attoyac-----	0-10	2.0-8.0	---	4.5-6.5	0	0	0	0
	10-80	---	4.0-15	4.5-6.0	0	0	0	0
AuD:								
Austonio-----	0-16	5.0-12	---	4.0-6.5	0	0	0.0-2.0	0
	16-70	---	10-20	4.0-6.0	0	0	0.0-2.0	0
	70-80	5.0-15	---	4.0-6.5	0	0	0.0-2.0	0
BaB:								
Bernaldo-----	0-5	4.0-7.0	---	5.1-6.5	0	0	0	0
	5-15	4.0-7.0	---	5.1-6.5	0	0	0	0
	15-27	10-20	---	4.5-6.5	0	0	0	0
	27-80	5.0-15	---	4.5-6.5	0	0	0	0
BeA:								
Besner-----	0-13	2.0-5.0	---	4.1-6.5	0	0	0	0
	13-51	2.0-5.0	---	4.1-6.5	0	0	0	0
	51-80	3.0-10	---	4.1-6.5	0	0	0	0
BfC:								
Betis-----	0-28	---	1.0-5.0	4.5-6.0	0	0	0	0
	28-80	---	1.0-5.0	4.5-6.0	0	0	0	0
BnA:								
Bonn-----	0-31	4.0-15	---	4.5-7.3	0	0	0	0
	31-56	5.0-20	---	5.6-9.0	0	0	0	0
	56-83	10-30	---	6.6-9.0	0	0	0	0
Cart-----	0-4	---	2.0-10	4.5-6.0	0	0	0	0
	4-17	---	2.0-10	4.5-6.0	0	0	0	0
	17-57	---	2.0-10	4.5-6.0	0	0	0	0
	57-65	---	2.0-15	4.5-5.5	0	0	0	0
	65-80	---	5.0-20	4.5-5.5	0	0	0	0
BwB:								
Bowie-----	0-17	2.0-10	---	4.5-6.5	0	0	0	0
	17-41	---	5.0-15	4.5-5.5	0	0	0	0
	41-80	---	5.0-30	4.5-5.5	0	0	0	0
CbE:								
Cuthbert-----	0-5	3.0-9.0	---	4.5-6.5	0	0	0	0
	5-20	---	10-20	3.6-5.5	0	0	0	0
	20-30	---	5.0-15	3.6-5.5	0	0	0	0
	30-80	---	1.0-5.0	3.6-5.0	0	0	0	0

Soil Survey of Shelby County, Texas

Table 19.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<u>Inches</u>	<u>meq/100 g</u>	<u>meq/100 g</u>	<u>pH</u>	<u>Pct</u>	<u>Pct</u>	<u>mmhos/cm</u>	
CgE:								
Cuthbert-----	0-6	3.0-9.0	---	4.5-6.5	0	0	0	0
	6-31	---	10-20	3.6-5.5	0	0	0	0
	31-37	---	5.0-15	3.6-5.5	0	0	0	0
	37-80	---	1.0-5.0	3.6-5.0	0	0	0	0
CrG:								
Cuthbert-----	0-2	---	5.0-15	3.6-5.5	0	0	0.0-2.0	0
	2-22	---	10-20	3.6-5.5	0	0	0.0-2.0	0
	22-80	---	1.0-5.0	3.6-5.0	0	0	0.0-2.0	0
CsG:								
Cuthbert-----	0-15	3.0-9.0	---	4.5-6.5	0	0	0	0
	15-25	---	5.0-15	3.6-5.5	0	0	0	0
	25-60	---	1.0-5.0	3.6-5.0	0	0	0	0
CtG:								
Cuthbert-----	0-10	3.0-9.0	---	4.5-6.5	0	0	0	0
	10-33	---	10-20	3.6-5.5	0	0	0	0
	33-80	---	1.0-5.0	3.6-5.0	0	0	0	0
DaC:								
Darco-----	0-5	1.0-3.0	---	4.5-6.5	0	0	0	0
	5-62	1.0-3.0	---	4.5-6.5	0	0	0	0
	62-80	3.0-10	---	4.5-6.5	0	0	0	0
DaE:								
Darco-----	0-6	1.0-3.0	---	4.5-6.5	0	0	0	0
	6-49	1.0-3.0	---	4.5-6.5	0	0	0	0
	49-54	3.0-10	---	4.5-6.5	0	0	0	0
	54-80	3.0-10	---	4.5-6.5	0	0	0	0
Dr:								
Dreka-----	0-9	10-25	---	5.6-7.8	0	0	0.0-2.0	0
	9-30	10-20	---	5.6-7.8	0	0	0.0-2.0	0-2
	30-80	15-30	---	5.6-7.8	0	0	0.0-4.0	0-4
EeB:								
Eastwood-----	0-10	---	10-20	4.5-6.0	0	0	0	0
	10-55	---	15-50	3.6-5.5	0	0	0	0-2
	55-80	15-50	---	4.5-7.3	0	0-5	0.0-4.0	0-8
EeD:								
Eastwood-----	0-4	---	10-20	4.5-6.0	0	0	0	0
	4-47	---	15-50	3.6-5.5	0	0	0	0-2
	47-80	15-50	---	4.5-7.3	0	0-5	0.0-4.0	0-8
ElA:								
Eastwood-----	0-6	---	10-20	4.5-6.0	0	0	0	0
	6-35	---	15-50	3.6-5.5	0	0	0	0-2
	35-43	---	15-50	3.6-6.5	0	0-5	0.0-2.0	0-4
	43-80	15-50	---	4.5-7.3	0	0-5	0.0-4.0	0-8
Latex-----								
	0-14	---	2.0-15	4.5-6.0	0	0	0	0
	14-31	---	2.0-15	4.5-5.5	0	0	0	0
	31-39	---	2.0-15	4.5-5.5	0	0	0	0
	39-80	---	12-40	4.5-5.0	0	0	0	0

Soil Survey of Shelby County, Texas

Table 19.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<u>Inches</u>	<u>meq/100 g</u>	<u>meq/100 g</u>	<u>pH</u>	<u>Pct</u>	<u>Pct</u>	<u>mmhos/cm</u>	
GaA:								
Gallime-----	0-21	5.0-15	---	5.1-6.5	0	0	0	0
	21-43	5.0-15	---	5.1-6.5	0	0	0	0
	43-80	---	15-35	4.5-6.0	0	0	0	0
Guyton-----	0-8	---	4.0-10	3.6-6.0	0	0	0	0
	8-60	---	10-30	3.6-6.0	0	0-5	0	0
	60-80	10-30	---	3.6-8.4	0	0-5	0	0-10
GaB:								
Gallime-----	0-3	5.0-15	---	5.1-6.5	0	0	0	0
	3-20	5.0-15	---	5.1-6.5	0	0	0	0
	20-80	---	15-35	4.5-6.0	0	0	0	0
GrB:								
Grapeland-----	0-6	---	2.0-6.0	3.5-5.5	0	0	0.0-2.0	0
	6-80	---	2.0-8.0	3.5-5.5	0	0	0.0-2.0	0
GtA:								
Guyton-----	0-15	---	4.0-10	4.5-6.0	0	0	0	0
	15-80	---	10-30	4.5-6.0	0	0	0	0
HaB:								
Hainesville-----	0-7	1.0-5.0	---	4.5-6.5	0	0	0.0-2.0	0
	7-80	1.0-6.0	---	4.5-6.5	0	0	0.0-2.0	0
Iu:								
Iulus-----	0-4	---	2.0-10	4.5-6.0	0	0	0.0-2.0	0
	4-24	---	2.0-10	4.5-6.0	0	0	0.0-2.0	0
	24-80	---	5.0-15	4.5-6.0	0	0	0.0-2.0	0
KfC:								
Kirvin-----	0-12	1.0-10	---	4.6-6.5	0	0	0	0
	12-41	---	10-25	3.6-5.5	0	0	0	0
	41-43	---	10-25	3.6-5.0	0	0	0	0
	43-80	---	10-20	3.6-5.5	0	0	0	0
KgC:								
Kirvin-----	0-9	1.0-10	---	4.6-6.5	0	0	0	0
	9-41	---	10-25	3.6-5.5	0	0	0	0
	41-55	---	10-25	3.6-5.0	0	0	0	0
	55-80	---	10-20	3.6-5.5	0	0	0	0
KsC:								
Kirvin-----	0-6	10-20	---	4.6-6.5	0	0	0	0
	6-35	---	10-25	3.6-5.5	0	0	0	0
	35-47	---	10-25	3.6-5.0	0	0	0	0
	47-80	---	10-20	3.6-5.5	0	0	0	0
La:								
Laneville-----	0-18	5.0-15	---	4.6-6.5	0	0	0	0
	18-35	---	10-20	3.6-5.5	0	0	0.0-2.0	0-2
	35-80	---	15-30	3.6-6.0	0	0	0.0-4.0	0-4
Lf:								
Laneville-----	0-24	5.0-15	---	4.6-6.5	0	0	0	0
	24-35	---	10-20	3.6-5.5	0	0	0.0-2.0	0-2
	35-80	---	15-30	3.6-6.0	0	0	0.0-4.0	0-4

Soil Survey of Shelby County, Texas

Table 19.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<u>Inches</u>	<u>meq/100 g</u>	<u>meq/100 g</u>	<u>pH</u>	<u>Pct</u>	<u>Pct</u>	<u>mmhos/cm</u>	
LtB:								
Latex -----	0-11	---	2.0-15	4.5-6.0	0	0	0	0
	11-22	---	2.0-15	4.5-5.5	0	0	0	0
	22-55	---	2.0-15	4.5-5.5	0	0	0	0
	55-80	---	12-40	4.5-5.0	0	0	0	0
LuC:								
Lilbert -----	0-6	---	5.0-10	4.5-6.0	0	0	0	0
	6-31	---	5.0-10	4.5-6.0	0	0	0	0
	31-39	---	10-25	3.6-5.5	0	0	0	0
	39-80	---	10-25	3.6-5.5	0	0	0	0
MaE:								
Maben -----	0-4	---	2.0-10	4.5-6.5	0	0	0	0
	4-28	---	2.0-10	4.5-6.0	0	0	0	0
MaG:								
Maben -----	0-3	---	2.0-10	4.5-6.5	0	0	0	0
	3-30	---	2.0-10	4.5-6.0	0	0	0	0
McA:								
Metcalf -----	0-10	---	5.0-15	3.6-6.0	0	0	0	0
	10-36	---	10-30	3.6-6.0	0	0	0	0
	36-80	---	20-50	3.6-6.0	0	0	0.0-2.0	0
MeA:								
Metcalf -----	0-7	---	5.0-15	3.6-6.0	0	0	0	0
	7-35	---	10-30	3.6-6.0	0	0	0	0
	35-80	---	20-50	3.6-6.0	0	0	0.0-2.0	0
Sawtown -----	0-30	---	4.0-10	4.5-6.0	0	0	0	0
	30-49	---	10-20	3.6-6.0	0	0	0	0
	49-80	---	20-40	3.6-6.5	0	0-5	0.0-4.0	0-4
MfA:								
Metcalf -----	0-11	---	5.0-15	3.6-6.0	0	0	0	0
	11-37	---	10-30	3.6-6.0	0	0	0	0
	37-65	---	20-50	3.6-6.0	0	0	0	0
	65-80	---	7.0-15	4.5-5.5	0	0	0.0-2.0	0
Timpson -----	0-7	5.0-10	---	4.5-6.5	0	0	0	0
	7-21	1.0-10	---	4.5-6.0	0	0	0	0
	21-53	4.0-15	---	3.6-5.5	0	0	0	0
	53-74	8.0-25	---	3.6-5.0	0	0	0	0
	74-80	10-20	---	3.6-5.0	0	0	0	0
MhC:								
Meth -----	0-8	2.0-10	---	5.1-6.5	0	0	0	0
	8-30	---	15-40	4.5-6.0	0	0	0	0
	30-85	---	5.0-25	4.5-6.0	0	0	0	0
MpA:								
Mollville -----	0-9	---	5.0-15	4.5-6.0	0	0	0.0-2.0	0-2
	9-57	---	15-25	4.5-6.0	0	0	0.0-4.0	2-10
	57-76	10-25	---	5.1-7.8	0-2	0-3	0.0-4.0	2-10
	76-80	5.0-10	---	5.1-7.8	0-2	0-3	0.0-4.0	2-10

Soil Survey of Shelby County, Texas

Table 19.—Chemical Soil Properties—Continued

Map symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<u>Inches</u>	<u>meq/100 g</u>	<u>meq/100 g</u>	<u>pH</u>	<u>Pct</u>	<u>Pct</u>	<u>mmhos/cm</u>	
MpA:								
Besner-----	0-7	2.0-5.0	---	4.1-6.5	0	0	0	0
	7-46	2.0-5.0	---	4.1-6.5	0	0	0	0
	46-80	3.0-10	---	4.1-6.5	0	0	0	0
Ow:								
Owentown-----	0-3	5.0-15	---	5.1-6.0	0	0	0.0-2.0	0
	3-80	5.0-20	---	5.1-6.0	0	0	0.0-2.0	0
Ox:								
Owentown-----	0-6	5.0-15	---	5.1-6.0	0	0	0.0-2.0	0
	6-45	5.0-20	---	5.1-6.0	0	0	0.0-2.0	0
	45-80	5.0-15	---	5.1-6.0	0	0	0.0-2.0	0
RnB:								
Rentzel-----	0-24	1.0-5.0	---	4.1-6.0	0	0	0	0
	24-80	---	3.0-10	3.5-5.5	0	0	0	0
SaC:								
Sacul-----	0-12	---	5.0-15	4.5-6.0	0	0	0	0
	12-43	---	20-45	3.6-5.5	0	0	0	0
	43-80	---	15-40	3.6-5.5	0	0	0	0
SfA:								
Sawtown-----	0-4	4.0-8.0	---	4.5-6.5	0	0	0	0
	4-30	---	4.0-10	4.5-6.0	0	0	0	0
	30-54	---	10-20	3.6-6.0	0	0	0	0
	54-80	---	20-40	3.6-6.5	0	0-5	0.0-4.0	0-4
TnB:								
Tenaha-----	0-3	---	1.0-5.0	4.5-6.0	0	0	0	0
	3-31	---	1.0-5.0	4.5-6.0	0	0	0	0
	31-46	---	5.0-20	3.5-5.5	0	0	0	0
	46-80	---	5.0-20	3.5-5.5	0	0	0	0
TnD:								
Tenaha-----	0-2	---	1.0-5.0	4.5-6.0	0	0	0	0
	2-29	---	1.0-5.0	4.5-6.0	0	0	0	0
	29-55	---	5.0-20	3.5-5.5	0	0	0	0
	55-80	---	5.0-20	3.5-5.5	0	0	0	0
TnG:								
Tenaha-----	0-3	---	1.0-5.0	4.5-6.0	0	0	0	0
	3-21	---	1.0-5.0	4.5-6.0	0	0	0	0
	21-43	---	5.0-20	3.5-5.5	0	0	0	0
	43-80	---	5.0-20	3.5-5.5	0	0	0	0
W. Water								

Soil Survey of Shelby County, Texas

Table 20.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top In	Hardness		Uncoated steel	Concrete
AbA:						
Alazan-----	---	---	---	None	High	Moderate
Besner-----	---	---	---	None	Low	Moderate
AtB:						
Attoyac-----	---	---	---	None	Moderate	Moderate
AuD:						
Austonio-----	---	---	---	None	Moderate	Moderate
BaB:						
Bernaldo-----	---	---	---	None	Moderate	Moderate
BeA:						
Besner-----	---	---	---	None	Low	Moderate
BfC:						
Betis-----	---	---	---	None	Low	Moderate
BnA:						
Bonn-----	Natric	8-16	Noncemented	---	High	Low
Cart-----	Fragipan	40-57	Noncemented	None	Moderate	Moderate
BwB:						
Bowie-----	Plinthite	25-60	Noncemented	None	Moderate	High
CbE:						
Cuthbert-----	Dense material	20-40	Noncemented	None	High	High
CgE:						
Cuthbert-----	Dense material	20-40	Noncemented	None	High	High
CrG:						
Cuthbert-----	Dense material	20-40	Noncemented	None	High	High
CsG:						
Cuthbert-----	Dense material	20-40	Noncemented	None	High	High
CtG:						
Cuthbert-----	Dense material	20-40	Noncemented	None	High	High
DaC:						
Darco-----	---	---	---	None	Low	Moderate
DaE:						
Darco-----	---	---	---	None	Low	Moderate
Dr:						
Dreka-----	---	---	---	None	High	Low
EeB:						
Eastwood-----	Dense material	40-60	Noncemented	None	High	High

Soil Survey of Shelby County, Texas

Table 20.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top In	Hardness		Uncoated steel	Concrete
EeD: Eastwood-----	Dense material	40-60	Noncemented	None	High	High
ElA: Eastwood-----	Dense material	40-60	Noncemented	None	High	High
Latex-----	---	---	---	None	Moderate	High
GaA: Gallime-----	---	---	---	None	Moderate	Moderate
Guyton-----	---	---	---	None	High	High
GaB: Gallime-----	---	---	---	None	Moderate	Moderate
GrB: Grapeland-----	---	---	---	None	Low	Moderate
GtA: Guyton-----	---	---	---	None	High	Moderate
HaB: Hainesville-----	---	---	---	None	Low	Moderate
Iu: Iulus-----	---	---	---	None	Moderate	High
KfC: Kirvin-----	Dense material	40-60	Noncemented	None	High	High
KgC: Kirvin-----	Dense material	40-60	Noncemented	None	High	High
KsC: Kirvin-----	Dense material	40-60	Noncemented	None	High	High
La: Laneville-----	---	---	---	None	High	High
Lf: Laneville-----	---	---	---	None	High	High
LtB: Latex-----	---	---	---	None	Moderate	High
LuC: Lilbert-----	---	---	---	None	Moderate	High
MaE: Maben-----	Dense material	20-40	Noncemented	None	High	Moderate
MaG: Maben-----	Dense material	20-40	Noncemented	None	High	Moderate
McA: Metcalf-----	---	---	---	---	High	Moderate

Soil Survey of Shelby County, Texas

Table 20.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Potential for frost action	Risk of corrosion	
	Kind	Depth to top <u>In</u>	Hardness		Uncoated steel	Concrete
MeA:						
Metcalf-----	---	---	---	---	High	Moderate
Sawtown-----	---	---	---	None	Moderate	Moderate
MfA:						
Metcalf-----	---	---	---	---	High	Moderate
Timpson-----	---	---	---	---	High	Moderate
MhC:						
Meth-----	---	---	---	None	High	Moderate
MpA:						
Mollville-----	---	---	---	None	High	High
Besner-----	---	---	---	None	Low	Moderate
Ow:						
Owentown-----	---	---	---	None	Moderate	Moderate
Ox:						
Owentown-----	---	---	---	None	Moderate	Moderate
RnB:						
Rentzel-----	---	---	---	None	High	High
SaC:						
Sacul-----	Dense material	40-80	Noncemented	None	High	High
SfA:						
Sawtown-----	---	---	---	None	Moderate	Moderate
TnB:						
Tenaha-----	Dense material	40-60	Noncemented	None	Moderate	Moderate
TnD:						
Tenaha-----	Bedrock (densic)	40-60	Noncemented	None	Moderate	Moderate
TnG:						
Tenaha-----	Bedrock (densic)	40-60	Noncemented	None	Moderate	Moderate
W. Water						

Table 21.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding		Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration
AbA: Alazan-----	C	Negligible		<u>Ft</u>	<u>Ft</u>				
			January	1.5-2.5	>6.0	---	None	---	None
			February	1.5-2.5	>6.0	---	None	---	None
			March	1.5-2.5	>6.0	---	None	---	None
			April	1.5-2.5	>6.0	---	None	---	None
			May-Dec	---	---	---	None	---	None
Besner-----	B	Negligible	January	3.3-5.0	>6.0	---	None	---	None
			February	3.3-5.0	>6.0	---	None	---	None
			March-Dec	---	---	---	None	---	None
AtB: Attoyac-----	B	Very low	Jan-Dec	---	---	---	None	---	None
AuD: Austonio-----	B	Medium	Jan-Dec	---	---	---	None	---	None
BaB: Bernaldo-----	B	Very low	January	4.0-6.0	>6.0	---	None	---	None
			February	4.0-6.0	4.5-6.0	---	None	---	None
			March	4.0-6.0	4.5-6.0	---	None	---	None
			April	4.0-6.0	4.5-6.0	---	None	---	None
			May	4.0-6.0	4.5-6.0	---	None	---	None
			June-Oct	---	---	---	None	---	None
			November	4.0-6.0	4.5-6.0	---	None	---	None
			December	4.0-6.0	4.5-6.0	---	None	---	None
BeA: Besner-----	B	Negligible	January	3.3-5.0	>6.0	---	None	---	None
			February	3.3-5.0	>6.0	---	None	---	None
			March-Dec	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding		Flooding		
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
BfC: Betis-----	A	Very low	Jan-Dec	---	---	---	---	None	---	None
BnA: Bonn-----	D	---	January February March April May-Nov December	0.0-1.2 0.0-1.2 0.0-1.2 0.0-1.2 --- 0.0-1.2	0.5-1.5 0.5-1.5 0.5-1.5 0.5-1.5 --- 0.5-1.5	--- --- --- --- --- ---	--- --- --- --- --- ---	None None None None None None	--- --- --- --- --- ---	None None None None None None
Cart-----	B	Low	January February March April May June-Oct November December	3.0-4.0 3.0-4.0 3.0-4.0 3.0-4.0 3.0-4.0 --- 3.0-4.0 3.0-4.0	3.5-5.0 3.5-5.0 3.5-5.0 3.5-5.0 3.5-5.0 --- 3.5-5.0 3.5-5.0	--- --- --- --- --- --- --- ---	--- --- --- --- --- --- --- ---	None None None None None None None None	--- --- --- --- --- --- --- ---	None None None None None None None None
BwB: Bowie-----	B	Low	January February March April May-Dec	3.5-5.0 3.5-5.0 3.5-5.0 3.5-5.0 ---	4.0-6.0 4.0-6.0 4.0-6.0 4.0-6.0 ---	--- --- --- --- ---	--- --- --- --- ---	None None None None None	--- --- --- --- ---	None None None None None
CbE: Cuthbert-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None
CgE: Cuthbert-----	C	High	Jan-Dec	---	---	---	---	None	---	None
CrG: Cuthbert-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding		Flooding		
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
CSG: Cuthbert-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None
CtG: Cuthbert-----	C	High	Jan-Dec	---	---	---	---	None	---	None
DaC: Darco-----	A	Very low	Jan-Dec	---	---	---	---	None	---	None
DaE: Darco-----	A	Low	Jan-Dec	---	---	---	---	None	---	None
Dr: Dreka-----	D	---	January February March April May June-Oct November December	0.5-2.5 0.5-2.5 0.5-2.5 0.5-2.5 0.5-2.5 --- 0.5-2.5 0.5-2.5	>6.0 >6.0 >6.0 >6.0 >6.0 --- >6.0 >6.0	--- --- --- --- --- --- --- ---	--- --- --- --- --- --- --- ---	None None None None None None None None	Long Long Long Long Long --- Long Long	Frequent Frequent Frequent Frequent Frequent None Frequent Frequent
EeB: Eastwood-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
EeD: Eastwood-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
ElA: Eastwood-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Latex-----	C	Low	January February March April May-Nov December	3.0-4.5 3.0-4.5 3.0-4.5 3.0-4.5 --- 3.0-4.5	3.5-5.0 3.5-5.0 3.5-5.0 3.5-5.0 --- 3.5-5.0	--- --- --- --- --- ---	--- --- --- --- --- ---	None None None None None None	--- --- --- --- --- ---	None None None None None None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
GaA: Gallime-----	B	Low		<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
			January	4.0-6.0	4.5-6.0	---	---	None	---	None
			February	4.0-6.0	4.5-6.0	---	---	None	---	None
			March	4.0-6.0	4.5-6.0	---	---	None	---	None
			April-Nov December	---	---	---	---	None	---	None
Guyton-----	D	Negligible	January	0.0-1.5	0.5-2.5	---	---	None	---	None
			February	0.0-1.5	0.5-2.5	---	---	None	---	None
			March	0.0-1.5	0.5-2.5	---	---	None	---	None
			April	0.0-1.5	0.5-2.5	---	---	None	---	None
			May June-Nov December	0.0-1.5 --- 0.0-1.5	0.5-2.5 --- 0.5-2.5	--- --- ---	--- --- ---	None None None	--- --- ---	None None None
GaB: Gallime-----	B	Negligible	January	4.0-6.0	4.5-6.0	---	---	None	---	None
			February	4.0-6.0	4.5-6.0	---	---	None	---	None
			March	4.0-6.0	4.5-6.0	---	---	None	---	None
			April-Nov	---	---	---	---	None	---	None
			December	4.0-6.0	4.5-6.0	---	---	None	---	None
GrB: Grapeland-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None
GtA: Guyton-----	D	Negligible	January	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			February	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			March	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			April	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			May	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			June	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			July	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			August	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			September	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			October	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			November	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent
			December	0.0	>6.0	0.0-1.0	Long	Frequent	Very long	Frequent

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Surface water depth	Ponding		Flooding	
				Upper limit	Lower limit		Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
HaB: Hainesville-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None
Iu: Iulus-----	B	Negligible	January	1.5-4.0	2.0-5.0	---	---	None	Very brief	Frequent
			February	1.5-4.0	2.0-5.0	---	---	None	Very brief	Frequent
			March	1.5-4.0	2.0-5.0	---	---	None	Very brief	Frequent
			April	1.5-4.0	2.0-5.0	---	---	None	Very brief	Frequent
			May-Nov	---	---	---	---	None	---	None
			December	1.5-4.0	2.0-5.0	---	---	None	Very brief	Frequent
KfC: Kirvin-----	C	Low	Jan-Dec	---	---	---	---	None	---	None
KgC: Kirvin-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None
KsC: Kirvin-----	C	Low	Jan-Dec	---	---	---	---	None	---	None
La: Laneville-----	B	Very low	January	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
			February	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
			March	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
			April	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
			May	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
			June-Oct	---	---	---	---	None	---	None
			November	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
			December	1.5-3.0	2.5-4.0	---	---	None	Brief	Occasional
Lf: Laneville-----	B	Very low	January	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent
			February	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent
			March	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent
			April	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent
			May	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent
			June-Oct	---	---	---	---	None	---	None
			November	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent
			December	1.5-3.0	2.5-4.0	---	---	None	Brief	Frequent

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Surface water depth	Ponding		Flooding	
				Upper limit	Lower limit		Duration	Frequency	Duration	Frequency
LtB: Latex-----	C	---		<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
			January	3.0-4.5	3.5-5.0	---	---	None	---	None
			February	3.0-4.5	3.5-5.0	---	---	None	---	None
			March	3.0-4.5	3.5-5.0	---	---	None	---	None
			April	3.0-4.5	3.5-5.0	---	---	None	---	None
			May-Nov	---	---	---	---	None	---	None
			December	3.0-4.5	3.5-5.0	---	---	None	---	None
LuC: Lilbert-----	B	Low	Jan-Dec	---	---	---	---	None	---	None
MaE: Maben-----	C	High	Jan-Dec	---	---	---	---	None	---	None
MaG: Maben-----	C	High	Jan-Dec	---	---	---	---	None	---	None
McA: Metcalf-----	D	High	January	1.5-2.5	2.0-3.5	---	---	None	---	None
			February	1.5-2.5	2.0-3.5	---	---	None	---	None
			March	1.5-2.5	2.0-3.5	---	---	None	---	None
			April	1.5-2.5	2.0-3.5	---	---	None	---	None
			May-Nov	---	---	---	---	None	---	None
			December	1.5-2.5	2.0-3.5	---	---	None	---	None
MeA: Metcalf-----	D	Medium	January	1.5-2.5	2.0-3.5	---	---	None	---	None
			February	1.5-2.5	2.0-3.5	---	---	None	---	None
			March	1.5-2.5	2.0-3.5	---	---	None	---	None
			April	1.5-2.5	2.0-3.5	---	---	None	---	None
			May-Nov	---	---	---	---	None	---	None
			December	1.5-2.5	2.0-3.5	---	---	None	---	None
Sawtown-----	C	Low	January	3.0-4.5	3.3-5.0	---	---	None	---	None
			February	3.0-4.5	3.3-5.0	---	---	None	---	None
			March	3.0-4.5	3.3-5.0	---	---	None	---	None
			April	3.0-4.5	3.3-5.0	---	---	None	---	None
			May	3.0-4.5	3.3-5.0	---	---	None	---	None
			June-Dec	---	---	---	---	None	---	None

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Surface water depth	Ponding		Flooding	
				Upper limit	Lower limit		Duration	Frequency	Duration	Frequency
MfA: Metcalf-----	D	High	January February March April May-Nov December	<u>Ft</u> 1.5-2.5 1.5-2.5 1.5-2.5 1.5-2.5 --- 1.5-2.5	<u>Ft</u> 2.0-3.5 2.0-3.5 2.0-3.5 2.0-3.5 --- 2.0-3.5	<u>Ft</u> --- --- --- --- --- ---	---	---	None None None None None None	
Timpson-----	C	Low	January February March April-Dec	2.5-3.5 2.5-3.5 2.5-3.5 ---	3.7-5.0 3.7-5.0 3.7-5.0 ---	--- --- --- ---	---	---	None None None None	
MhC: Meth-----	C	Low	Jan-Dec	---	---	---	---	---	None	
MpA: Mollville-----	D	---	January February March April May June July-Oct November December	0.0 0.0 0.0 0.0 0.0 0.0 --- 0.0 0.0	>6.0 >6.0 >6.0 >6.0 >6.0 >6.0 --- >6.0 >6.0	0.0-0.5 0.0-0.5 0.0-0.5 0.0-0.5 0.0-0.5 0.0-0.5 --- 0.0-0.5 0.0-0.5	Long Long Long Long Long Long --- Long Long	Frequent Frequent Frequent Frequent Frequent Frequent None Frequent Frequent	None None None None None None None None None	
Besner-----	B	---	January February March-Dec	3.3-5.0 3.3-5.0 ---	>6.0 >6.0 ---	--- --- ---	---	---	None None None	
Ow: Owentown-----	B	---	January February March April May June-Oct November December	2.5-4.0 2.5-4.0 2.5-4.0 2.5-4.0 --- --- --- 2.5-4.0	>6.0 >6.0 >6.0 >6.0 --- --- --- >6.0	--- --- --- --- --- --- --- ---	---	Brief Brief Brief Brief --- Brief Brief	Occasional Occasional Occasional Occasional Occasional Occasional Occasional	

Table 21.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Surface water depth	Ponding		Flooding	
				Upper limit	Lower limit		Duration	Frequency	Duration	Frequency
				<u>Ft</u>	<u>Ft</u>	<u>Ft</u>				
Ox: Owentown-----	B	Negligible								
			January	2.5-4.0	>6.0	---	---	None	Brief	Frequent
			February	2.5-4.0	>6.0	---	---	None	Brief	Frequent
			March	2.5-4.0	>6.0	---	---	None	Brief	Frequent
			April	2.5-4.0	>6.0	---	---	None	Brief	Frequent
			May	---	---	---	---	None	Brief	Frequent
			June-Oct	---	---	---	---	None	---	None
			November	---	---	---	---	None	Brief	Frequent
			December	2.5-4.0	>6.0	---	---	None	Brief	Frequent
RnB: Rentzel-----	C	Low								
			January	1.5-3.0	2.0-3.5	---	---	None	---	None
			February	1.5-3.0	2.0-3.5	---	---	None	---	None
			March	1.5-3.0	2.0-3.5	---	---	None	---	None
SaC: Sacul-----	C	High	April-Dec	---	---	---	---	None	---	None
			January	2.0-4.0	2.5-4.5	---	---	None	---	None
			February	2.0-4.0	2.5-4.5	---	---	None	---	None
			March	2.0-4.0	2.5-4.5	---	---	None	---	None
			April	2.0-4.0	2.5-4.5	---	---	None	---	None
			May-Nov	---	---	---	---	None	---	None
			December	2.0-4.0	2.5-4.5	---	---	None	---	None
SfA: Sawtown-----	C	Low								
			January	3.0-4.5	3.3-5.0	---	---	None	---	None
			February	3.0-4.5	3.3-5.0	---	---	None	---	None
			March	3.0-4.5	3.3-5.0	---	---	None	---	None
			April	3.0-4.5	3.3-5.0	---	---	None	---	None
			May	3.0-4.5	3.3-5.0	---	---	None	---	None
			June-Dec	---	---	---	---	None	---	None
TnB: Tenaha-----	B	Medium								
			Jan-Dec	---	---	---	---	None	---	None
TnD: Tenaha-----	B	Low								
			Jan-Dec	---	---	---	---	None	---	None

Soil Survey of Shelby County, Texas

Table 22.—Fertility Test Data for Selected Soils

(Absence of an entry indicates that analyses were not made. Location of sample pedon is the same as the location given for the series in the section "Soil Series and Their Morphology")

Soil name and sample number	Horizon	Depth	Organic carbon content	pH 1:1 H ₂ O	Extract-able phosphorous	Exchangeable cations						Total acidity
						Ca	Mg	K	Na	Al	H	
		In	Pct		Ppm	----Milliequivalents/100 grams of soil----						
Cart ¹ : (S83TX-419-003)	Ap	0-4		4.5		0.10	0.90	0.20	1.20	0.50		6.70
	E	4-11		5.5		2.50	0.70	0.10	0.30	---		1.80
	EB	11-17		4.8		2.10	0.50	0.20	0.40	1.00		3.80
	Bt	17-33		4.6		1.60	0.20	0.10	0.30	2.80		6.90
	Btx	33-57		4.7		1.20	0.90	0.10	0.30	5.70		9.30
	Btx/E	57-65		4.9		1.20	0.60	0.10	0.50	7.40		6.40
	2Btg	65-80		4.5		3.00	3.20	0.30	2.00	9.60		15.40
Eastwood ² : (S87TX-419-002)	A	0-7	1.95	4.7		0.90	0.60	0.10	0.10	2.00		
	E	7-10	0.38	5.3		1.00	0.60	0.00	0.10	0.00		
	Bt	10-19	0.41	4.6		0.50	4.20	0.30	0.30	14.40		
	Btss1	19-30	0.19	4.6		0.00	3.60	0.20	0.40	16.70		
	Btss2	30-40	0.16	4.8		0.00	4.60	0.20	0.60	13.70		
	Btss3	40-55	0.12	4.7		0.00	4.60	0.30	0.80	17.50		
	Cd1	55-67	0.11	4.4		0.00	6.50	0.20	0.90	8.00		
	Cd2	67-80	0.08	4.4		0.30	5.70	0.20	1.40	6.00		
Meth ¹ : (S97TX-419-003)	A	0-4		4.7		3.40	1.00	0.20	---	0.40		6.60
	E	4-8		5.2		1.50	0.70	0.20	---	0.30		2.60
	Bt1	8-21		5.0		5.10	5.00	0.50	---	6.40		11.20
	Bt2	21-30		4.8		2.50	3.60	0.60	---	15.80		15.20
	Bt3	30-43		4.6		1.00	2.20	0.00	---	12.10		11.70
	BCt1	43-54		4.7		2.40	2.20	0.40	0.30	12.60		11.80
	BCt2	54-69		4.6		0.70	2.10	0.40	---	11.50		10.40
	BC	69-80		4.8		0.70	2.00	0.40	0.50	10.20		9.70
Timpson ² : (S86TX-419-001)	A	0-7	2.86	5.4		3.10	0.50	0.10	0.10	0.20		
	E	7-13	0.27	4.6		0.20	0.20	0.00	0.10	1.00		
	BE	13-20	0.20	4.4		0.10	0.20	0.10	0.10	1.60		
	Bt1	20-27	0.17	4.6		0.30	0.60	0.10	0.10	2.40		
	Bt2	27-34	0.15	4.7		0.50	0.70	0.10	0.10	2.60		
	Bt3	34-43	0.14	4.6		0.50	0.70	0.10	0.10	3.00		
	Bt/E	43-52	0.10	4.9		0.60	0.80	0.10	0.10	3.30		
	2Btg/E	52-55	0.14	5.0		0.30	0.80	0.10	0.20	6.70		
	2Btg1	55-61	0.11	4.6		1.00	3.20	0.10	0.50	7.80		
	2Btg2	61-73	0.09	4.6		1.40	4.20	0.20	0.80	5.00		
2Bt't	73-80	0.14	4.5		1.50	5.40	0.10	0.80	2.20			

¹ Analyses by the Soil Characterization Laboratory, Natural Resources Conservation Service, Lincoln, Nebraska.

² Analyses by the Soil Characterization Laboratory, Texas Agricultural Experiment Station, College Station, Texas.

Table 23.--Physical Test Data for Selected Soils

(Dashes indicate that analyses were not made. TR indicates a trace amount)

Soil name and sample number	Hori- zon	Depth	Particle-size distribution										Water content			Bulk density			COLE	
			Sand					Silt (0.05- 0.002 mm)	Clay (0.002 mm)	1/3 bar	15 bar	Water reten- tion	1/3 bar	Air- dry	Oven- dry					
			Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5- 0.25- 0.1 mm)	Fine (0.25- 0.1 mm)	Very fine (0.1- 0.05mm)									Total (2.0- 0.05 mm)				
			-----Pct-----										Pct	Pct	In/in	-----g/cc-----				
Cart ¹ : (S00TX-419-002)		In																		
	Ap	0-4	0.2	0.2	1.7	17.3	31.0	50.4	42.7	6.9	---	---	---	5.0	---	---	---	---	---	---
	E	4-11	0.6	0.3	2.2	18.5	32.5	54.1	39.8	6.1	---	---	---	2.4	0.19	1.65	---	1.67	0.004	
	EB	11-17	0.3	0.4	1.9	17.3	30.7	50.6	40.3	9.1	12.8	3.2	0.14	3.2	0.14	1.59	---	1.62	0.006	
	Bt	17-33	0.3	0.4	1.7	15.7	29.6	47.7	38.1	14.2	13.4	5.0	0.13	5.0	0.13	1.54	---	1.59	0.011	
	Btx	33-57	0.7	0.3	1.7	14.7	23.0	40.4	39.0	20.6	18.2	7.8	0.16	7.8	0.16	1.58	---	1.68	0.020	
	Btx/E 2Btg	57-65 65-80	0.1 TR	0.1 ---	1.9 0.8	15.7 9.4	26.5 18.3	44.3 28.5	38.4 32.1	17.3 39.4	15.8 22.7	6.4 15.7	0.15 0.11	6.4 15.7	0.15 0.11	1.60 1.60	---	1.70 1.92	0.020 0.063	
Eastwood ² : (S87TX-419-002)	A	0-7	0.5	0.4	0.6	24.7	39.3	65.5	28.4	6.1	27.4	---	---	---	---	1.24	1.29	---	0.013	
	E	7-10	0.6	0.2	0.3	28.8	39.9	69.8	24.9	5.3	20.2	---	---	---	---	1.42	1.43	---	0.002	
	Bt	10-19	0.1	0.0	0.1	5.9	21.1	27.2	14.5	58.3	31.3	---	---	---	---	1.35	1.66	---	0.071	
	Btss1	19-30	0.1	0.1	0.1	6.5	28.1	34.9	16.6	48.5	27.5	---	---	---	---	1.46	1.68	---	0.048	
	Btss2	30-40	0.1	0.0	0.2	7.6	29.2	37.1	20.3	42.6	26.7	---	---	---	---	1.47	1.67	---	0.043	
	Btss3	40-55	0.0	0.0	0.1	3.7	25.0	28.8	26.2	45.0	26.9	---	---	---	---	1.48	1.78	---	0.063	
	Cd1 Cd2	55-67 67-80	0.0 0.0	0.0 0.1	0.9 0.2	12.4 8.5	34.9 30.7	48.2 39.5	21.9 27.0	29.9 33.5	22.2 22.9	---	---	---	---	1.57 1.56	1.69 1.63	---	0.025 0.015	
Meth ¹ : (S97TX-419-003)	A	0-4	1.8	0.9	2.4	41.0	24.1	70.2	25.5	4.3	---	---	---	6.4	---	---	---	---	---	
	E	4-8	3.2	1.2	1.5	37.3	25.5	68.7	26.9	4.4	11.0	2.4	0.12	2.4	0.12	1.53	---	1.55	0.004	
	Bt1	8-21	0.2	0.1	0.8	21.9	12.1	35.1	15.3	49.6	27.8	18.2	0.13	18.2	0.13	1.37	---	1.68	0.070	
	Bt2	21-30	0.5	0.1	0.6	34.3	5.8	41.3	15.7	43.0	22.6	16.5	0.07	16.5	0.07	1.55	---	1.73	0.037	
	Bt3	30-43	---	---	1.4	50.9	5.0	57.3	12.2	30.5	19.7	12.1	0.12	12.1	0.12	1.59	---	1.72	0.027	
	Bct1	43-54	---	---	1.3	53.3	6.8	61.4	12.4	26.2	19.7	11.0	0.14	11.0	0.14	1.58	---	1.69	0.023	
	Bct2 BC	54-69 69-85	---	0.1	1.9 1.2	55.0 62.3	6.7 7.6	63.7 71.3	12.7 12.2	23.6 16.5	19.1 16.5	10.4 10.6	0.14 0.09	10.4 15.3	0.14 0.09	1.57 1.53	---	1.65 1.62	0.017 0.019	
Timpson ² : (S86TX-419-001)	A	0-7	0.5	0.6	0.7	15.2	30.4	47.4	50.8	1.8	21.4	---	---	---	---	1.40	1.43	---	0.007	
	E	7-13	0.7	0.5	0.5	14.6	30.9	47.2	49.7	3.1	24.0	---	---	---	---	1.38	1.40	---	0.005	
	BE	13-20	0.5	0.4	0.5	14.2	29.6	45.2	49.2	5.6	16.4	---	---	---	---	1.39	1.40	---	0.002	
	Bt1	20-27	0.6	0.6	0.5	13.0	26.9	41.6	46.1	12.3	14.1	---	---	---	---	1.44	1.46	---	0.005	
	Bt2	27-34	0.5	0.8	0.5	11.4	24.0	37.2	47.3	15.5	16.6	---	---	---	---	1.54	1.58	---	0.009	
	Bt3	34-43	0.3	0.3	0.3	11.3	22.2	34.4	46.5	19.1	18.5	---	---	---	---	1.61	1.64	---	0.006	
	Bt/E 2Btg/E	43-52 52-55	0.0 0.1	0.1 0.1	0.2 0.1	12.5 9.2	23.7 17.9	36.5 27.4	47.4 42.6	16.1 30.0	16.4 30.0	---	---	---	---	1.69 1.72	---	1.65 1.62	0.017 0.019	
	2Btg1	55-61	0.0	0.0	0.1	8.5	17.2	25.8	37.5	36.7	21.4	---	---	---	---	1.64	1.85	---	0.041	
	2Btg2	61-73	0.0	0.1	0.2	12.4	22.0	34.7	33.1	32.2	---	---	---	---	---	---	---	---	---	
	2B't	73-80	0.0	0.1	0.2	29.8	24.6	54.7	23.3	22.0	---	---	---	---	---	---	---	---	---	

¹ Analyses by the Soil Characterization Laboratory, Natural Resources Conservation Service, Lincoln, Nebraska

² Analyses by the Soil Characterization Laboratory, Texas Agricultural Experiment Station, College Station, Texas.

Table 24.--Chemical Test Data for Selected Soils

(Dashes indicate that analyses were not made. TR indicates a trace amount. Location of sample pedon is the same as the location given for the series in the section "Soil Series and Their Morphology")

Soil name and sample number	Horizon	Depth	Extractable bases				Ex-tract-able acidity	Cation-exchange capacity (NH ₄ OAc)	Base saturation (NH ₄ OAc)	Organic carbon	pH		Ex-tract-able aluminum	Ex-tract-able iron	Ex-tract-able manganese
											1:2 CaCl ₂	1:1 H ₂ O			
			Ca	Mg	K	Na									
-----Milliequivalents-----															
		In						Pct	Pct	Pct			Ppm	Ppm	Ppm
Cartl: (S00TX-419-002)	Ap	0-5	0.1	0.9	0.2	1.2	6.7	6.6	36	---	4.2	4.5	0.1	0.9	TR
	E	5-9	2.5	0.7	0.1	0.3	1.8	3.4	100	---	4.9	5.5	0.1	0.3	TR
	EB	9-14	2.1	0.5	0.2	0.4	3.8	3.4	94	---	4.2	4.9	0.1	0.8	TR
	Bt	14-19	1.6	0.2	0.1	0.3	6.0	5.2	42	---	3.9	4.6	0.1	0.7	TR
	Btx	19-24	1.2	0.9	0.1	0.3	9.3	7.9	32	---	3.8	4.7	0.2	0.1	TR
	Btx/E	24-32	1.2	0.6	0.1	0.5	6.4	6.5	37	---	3.8	4.9	0.1	1.3	---
	2Btg	32-43	3.0	3.0	0.3	2.0	15.4	19.2	44	---	3.8	4.5	0.2	0.9	---
Eastwood ² : (S87TX-419-002)	A	0-7	0.9	0.6	0.1	0.1	---	7.8	22	1.95	---	4.7	---	---	---
	E	7-10	1.0	0.6	0.0	0.1	---	3.6	47	0.38	---	5.3	---	---	---
	Bt	10-19	0.5	4.2	0.3	0.3	---	22.7	24	0.41	---	4.6	---	---	---
	Btss1	19-30	0.0	3.6	0.2	0.4	---	21.1	20	0.19	---	4.6	---	---	---
	Btss2	30-40	0.0	4.6	0.2	0.6	---	20.8	26	0.16	---	4.8	---	---	---
	Btss3	40-55	0.0	4.6	0.3	0.8	---	25.5	23	0.12	---	4.7	---	---	---
	Cd1	55-67	0.0	6.5	0.2	0.9	---	18.7	41	0.11	---	4.4	---	---	---
Cd2	67-80	0.3	5.7	0.2	1.4	---	20.8	37	0.08	---	4.4	---	---	---	
Meth ¹ : (S97TX-419-003)	A	0-4	3.4	1.0	0.2	---	6.6	7.3	63	---	4.3	4.7	---	---	---
	E	4-8	1.5	0.7	0.2	---	2.6	3.3	73	---	4.5	5.2	---	---	---
	Bt1	8-21	5.1	5.0	0.5	---	11.2	17.1	62	---	4.1	5.0	---	---	---
	Bt2	21-30	2.5	3.6	0.6	---	15.2	17.5	38	---	3.8	4.8	---	---	---
	Bt3	30-43	1.0	2.2	---	---	11.7	11.6	28	---	3.8	4.6	---	---	---
	Bct1	43-54	2.4	2.2	0.4	0.3	11.8	11.4	46	---	3.7	4.7	---	---	---
	Bct2	54-69	0.7	2.1	0.4	---	10.4	9.7	33	---	3.7	4.6	---	---	---
BC	69-85	0.7	2.0	0.4	0.5	9.7	10.0	36	---	3.7	4.8	---	---	---	
Timpson ² : (S86TX-419-001)	A	0-7	3.1	0.5	0.1	0.1	---	5.4	70	2.86	---	5.4	---	---	---
	E	7-13	0.2	0.2	0.0	0.1	---	3.9	13	0.27	---	4.6	---	---	---
	BE	13-20	0.1	0.2	0.1	0.1	---	3.4	15	0.20	---	4.4	---	---	---
	Bt1	20-27	0.3	0.6	0.1	0.1	---	4.4	25	0.17	---	4.6	---	---	---
	Bt2	27-34	0.5	0.7	0.1	0.1	---	5.2	27	0.15	---	4.7	---	---	---
	Bt3	34-43	0.5	0.7	0.1	0.1	---	5.8	25	0.14	---	4.6	---	---	---
	Bt/E	43-52	0.6	0.8	0.1	0.1	---	5.0	33	0.10	---	4.9	---	---	---
2Btg/E	52-55	0.3	0.8	0.1	0.2	---	11.0	13	0.14	---	5.0	---	---	---	
2Btg1	55-61	1.0	3.2	0.1	0.5	---	15.9	31	0.11	---	4.6	---	---	---	
2Btg2	16-73	1.4	4.2	0.2	0.8	---	14.5	46	0.09	---	4.6	---	---	---	
2B't	73-80	1.5	5.4	0.1	0.8	---	10.0	78	0.14	---	4.5	---	---	---	

¹ Analyses by the Soil Characterization Laboratory, Natural Resources Conservation Service, Lincoln, Nebraska.

² Analyses by the Soil Characterization Laboratory, Texas Agricultural Experiment Station, College Station, Texas.

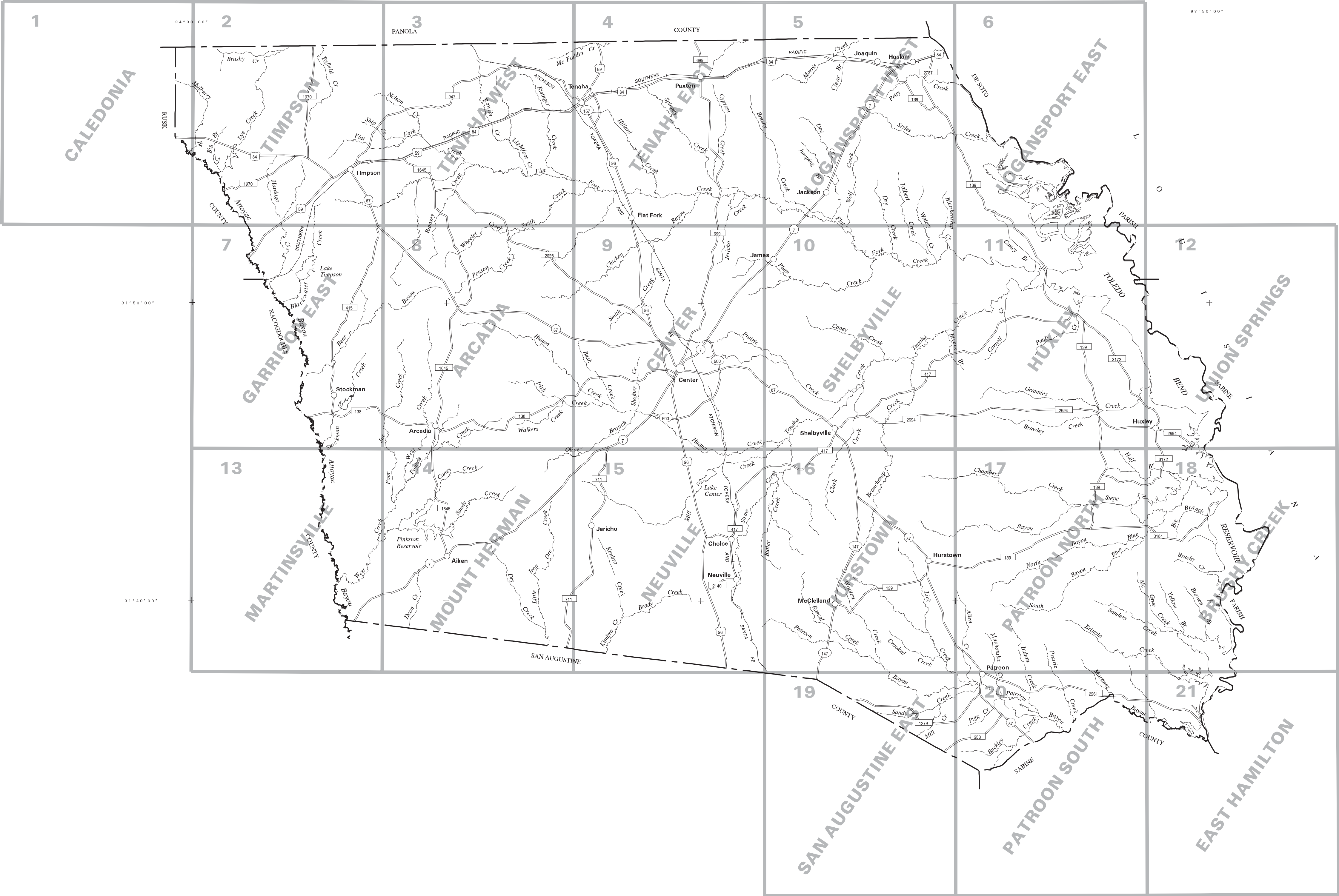
Soil Survey of Shelby County, Texas

Table 25.--Taxonomic Classification of the Soils

Soil name	Family or higher taxonomic class
Alazan-----	Fine-loamy, siliceous, semiactive, thermic Aquic GlossudalFs
Attoyac-----	Fine-loamy, siliceous, semiactive, thermic Typic PaleudalFs
Austonio-----	Fine-loamy, siliceous, active, thermic Typic HapludalFs
Bernaldo-----	Fine-loamy, siliceous, semiactive, thermic Glossic PaleudalFs
Besner-----	Coarse-loamy, siliceous, semiactive, thermic Typic GlossudalFs
Betis-----	Sandy, siliceous, thermic Lamellic Paleudults
Bonn-----	Fine-silty, mixed, superactive, thermic Glossic NatraqualFs
Bowie-----	Fine-loamy, siliceous, semiactive, thermic Plinthic Paleudults
Cart-----	Coarse-loamy, siliceous, semiactive, thermic Fragic GlossudalFs
Cuthbert-----	Fine, mixed, semiactive, thermic Typic Hapludults
Darco-----	Loamy, siliceous, semiactive, thermic Grossarenic Paleudults
Dreka-----	Fine-silty, siliceous, active, nonacid, thermic Fluvaquentic Epiaquepts
Eastwood-----	Fine, smectitic, thermic Chromic Vertic HapludalFs
Gallime-----	Fine-loamy, siliceous, semiactive, thermic Glossic PaleudalFs
Grapeland-----	Siliceous, thermic Psammentic Paleudults
Guyton-----	Fine-silty, siliceous, active, thermic Typic GlossaqualFs
Hainesville-----	Thermic, coated Lamellic Quartzipsamments
Iulus-----	Coarse-loamy, siliceous, active, thermic Fluvaquentic Dystrudepts
Kirvin-----	Fine, mixed, semiactive, thermic Typic Hapludults
Laneville-----	Fine-silty, siliceous, active, thermic Fluvaquentic Eutrudepts
Latex-----	Fine-loamy, siliceous, semiactive, thermic Glossic PaleudalFs
Lilbert-----	Loamy, siliceous, semiactive, thermic Arenic Plinthic Paleudults
Maben-----	Fine, mixed, active, thermic Ultic HapludalFs
Metcalf-----	Fine-silty, siliceous, semiactive, thermic Aquic GlossudalFs
Meth-----	Fine, mixed, semiactive, thermic Ultic HapludalFs
Mollville-----	Fine-loamy, siliceous, active, thermic Typic GlossaqualFs
Owentown-----	Coarse-loamy, siliceous, active, thermic Oxyaquic Dystrudepts
Rentzel-----	Loamy, siliceous, semiactive, thermic Arenic Plinthaquic Paleudults
Sacul-----	Fine, mixed, active, thermic Aquic Hapludults
Sawtown-----	Fine-loamy, siliceous, active, thermic Typic GlossudalFs
Tenaha-----	Loamy, siliceous, semiactive, thermic Arenic Hapludults
Timpson-----	Coarse-silty, siliceous, semiactive, thermic Oxyaquic GlossudalFs

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INDEX TO MAP SHEETS
SHELBY COUNTY, TEXAS

1 0 1 2 3
MILES

1 0 1 2 3 4 5 6
KILOMETERS

SCALE = 1:140000

SOIL LEGEND

Map symbols consist of a combination of letters and numbers. The first capital letter is the initial one of the soil name. The second is a lowercase letter. The third is a capital letter that indicates slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. The fourth symbol, when used, is a number and shows that the soil is eroded.

SYMBOL	NAME
AbA	Alazan-Besner complex, 0 to 1 percent slopes, mounded
AtB	Attoyac fine sandy loam, 0 to 5 percent slopes
AuD	Austonio fine sandy loam, 5 to 12 percent slopes
BaB	Bernaldo fine sandy loam, 0 to 3 percent slopes
BeA	Besner fine sandy loam, 0 to 3 percent slopes
BfC	Betis loamy fine sand, 0 to 8 percent slopes
BnA	Bonn-Cart complex, 0 to 2 percent slopes, mounded
BwB	Bowie fine sandy loam, 1 to 5 percent slopes
CbE	Cuthbert fine sandy loam, 5 to 15 percent slopes
CgE	Cuthbert gravelly fine sandy loam, 5 to 15 percent slopes
CrG	Cuthbert soils, 5 to 15 percent slopes, graded
CsG	Cuthbert fine sandy loam, 5 to 35 percent slopes, stony
CtG	Cuthbert fine sandy loam, 15 to 35 percent slopes
DaC	Darco loamy fine sand, 1 to 8 percent slopes
DaE	Darco loamy fine sand, 8 to 15 percent slopes
Dr	Dreka loam, 0 to 1 percent slopes, frequently flooded
EeB	Eastwood very fine sandy loam, 1 to 5 percent slopes
EeD	Eastwood very fine sandy loam, 5 to 15 percent slopes
EIA	Eastwood-Latex complex, 1 to 3 percent slopes, mounded
GaA	Gallime-Guyton complex, 0 to 2 percent slopes, mounded
GaB	Gallime very fine sandy loam, 1 to 3 percent slopes
GrB	Grapeland loamy fine sand, 1 to 5 percent slopes
GtA	Guyton silt loam, ponded
HaB	Hainesville fine sand, 0 to 2 percent slopes
Iu	Iulus soils, frequently flooded
KfC	Kirvin fine sandy loam, 1 to 5 percent slopes
KgC	Kirvin gravelly fine sandy loam, 1 to 5 percent slopes
KsC	Kirvin soils, 1 to 5 percent slopes, graded
La	Laneville silt loam, occasionally flooded
Lf	Laneville loam, 0 to 1 percent slopes, frequently flooded
LtB	Latex fine sandy loam, 1 to 3 percent slopes
LuC	Libert loamy fine sand, 1 to 5 percent slopes
MaE	Maben fine sandy loam, 5 to 15 percent slopes
MaG	Maben fine sandy loam, 15 to 35 percent slopes
McA	Metcalf very fine sandy loam, 0 to 2 percent slopes
MeA	Metcalf-Sawtown complex, 0 to 2 percent slopes, mounded
MfA	Metcalf-Timpson complex, 0 to 2 percent slopes, mounded
MhC	Meth fine sandy loam, 1 to 5 percent slopes
MpA	Mollville-Besner complex, 0 to 3 percent slopes, mounded
Ow	Owentown fine sandy loam, 0 to 1 percent slopes, occasionally flooded
Ox	Owentown fine sandy loam, 0 to 1 percent slopes, frequently flooded
RnB	Rentzel loamy fine sand, 0 to 5 percent slopes
SaC	Sacul fine sandy loam, 1 to 5 percent slopes
SfA	Sawtown very fine sandy loam, 0 to 2 percent slopes
TnB	Tenaha loamy fine sand, 1 to 5 percent slopes
TnD	Tenaha loamy fine sand, 5 to 15 percent slopes
TnG	Tenaha loamy fine sand, 15 to 35 percent slopes
W	Water

CONVENTIONAL AND SPECIAL
SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

County or parish



Minor civil division

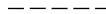


Field sheet matchline & neatline



ROADS

Trail, normally not shown



ROAD EMBLEM & DESIGNATIONS

Federal



State



County, farm or ranch



MISCELLANEOUS CULTURAL FEATURES

Church



School



WATER FEATURES

DRAINAGE

Perennial stream



Intermittent stream



Drainage end (indicates direction of flow)



SPECIAL SYMBOLS FOR SOIL
SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS





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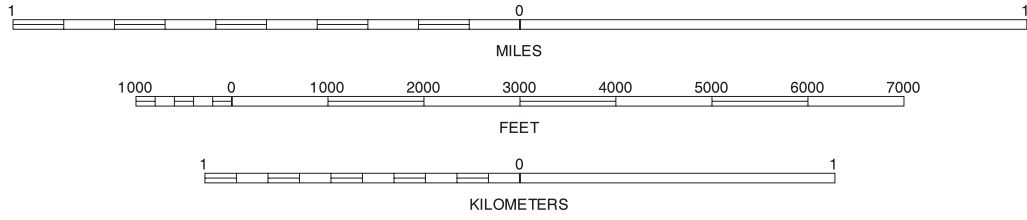
North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION

SCALE 1:24000



CALEDONIA, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 1 OF 21

Soil map delineations extending beyond the dashed white quadrangle neartline are for reference only and are included on adjacent map sheets.

North American Datum of 1983 (NAD83). GRS-80 Spheroid. 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

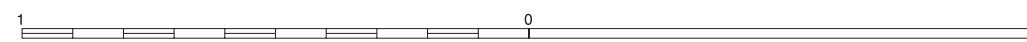
NORTH



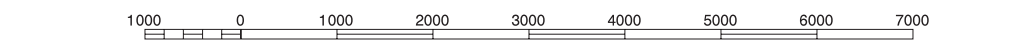
QUADRANGLE LOCATION

Joins sheet 7, Garrison East

SCALE 1:24000



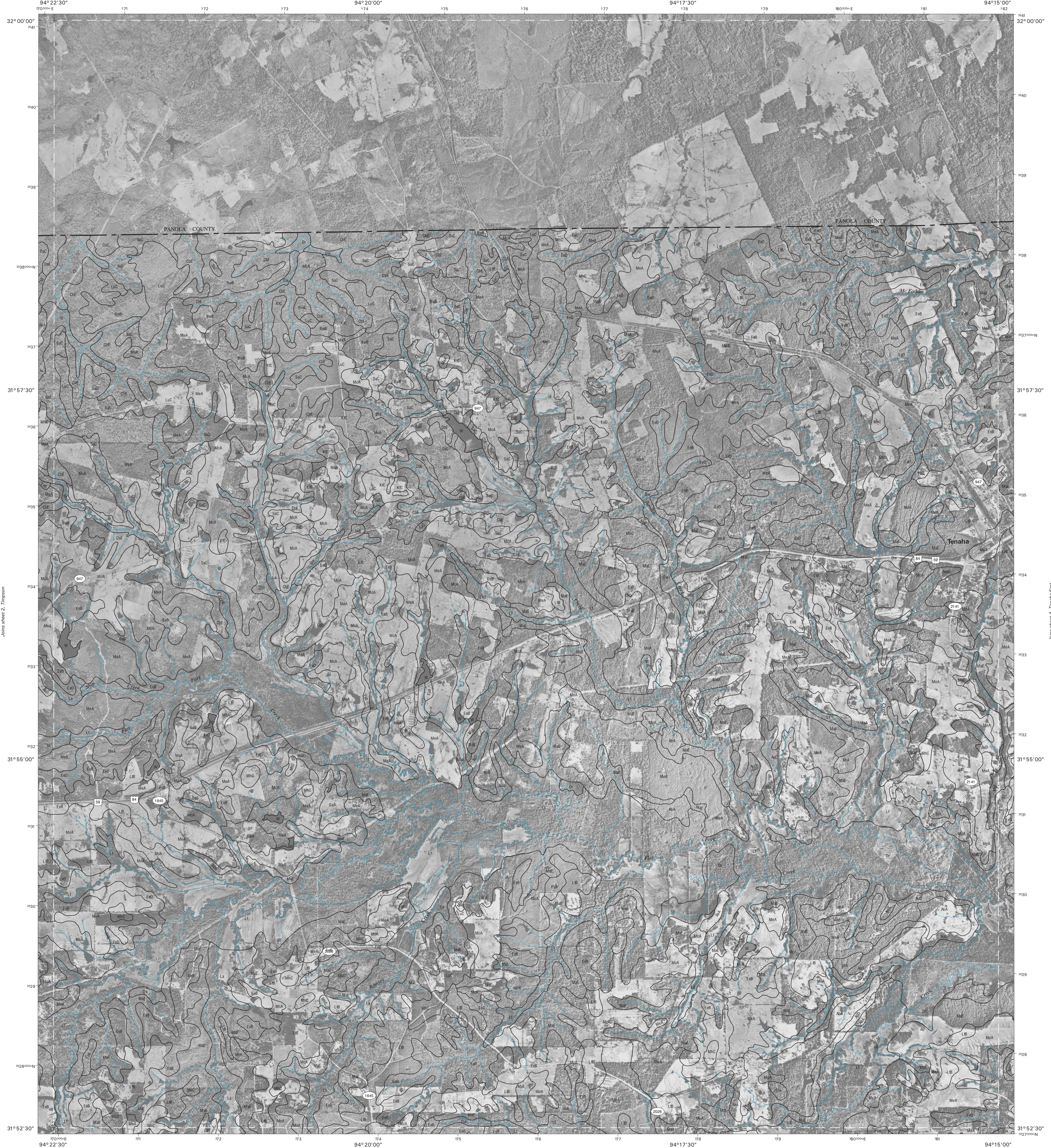
MILES



FEET

TIMPSON, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 2 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



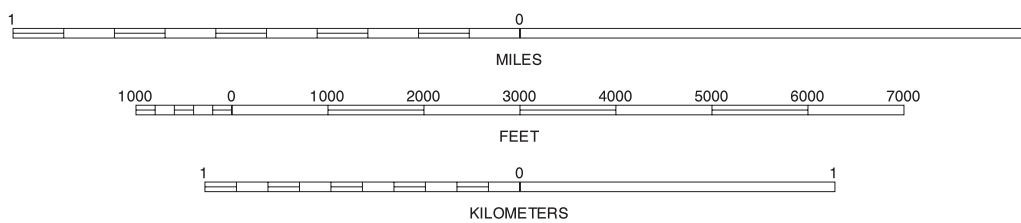
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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION

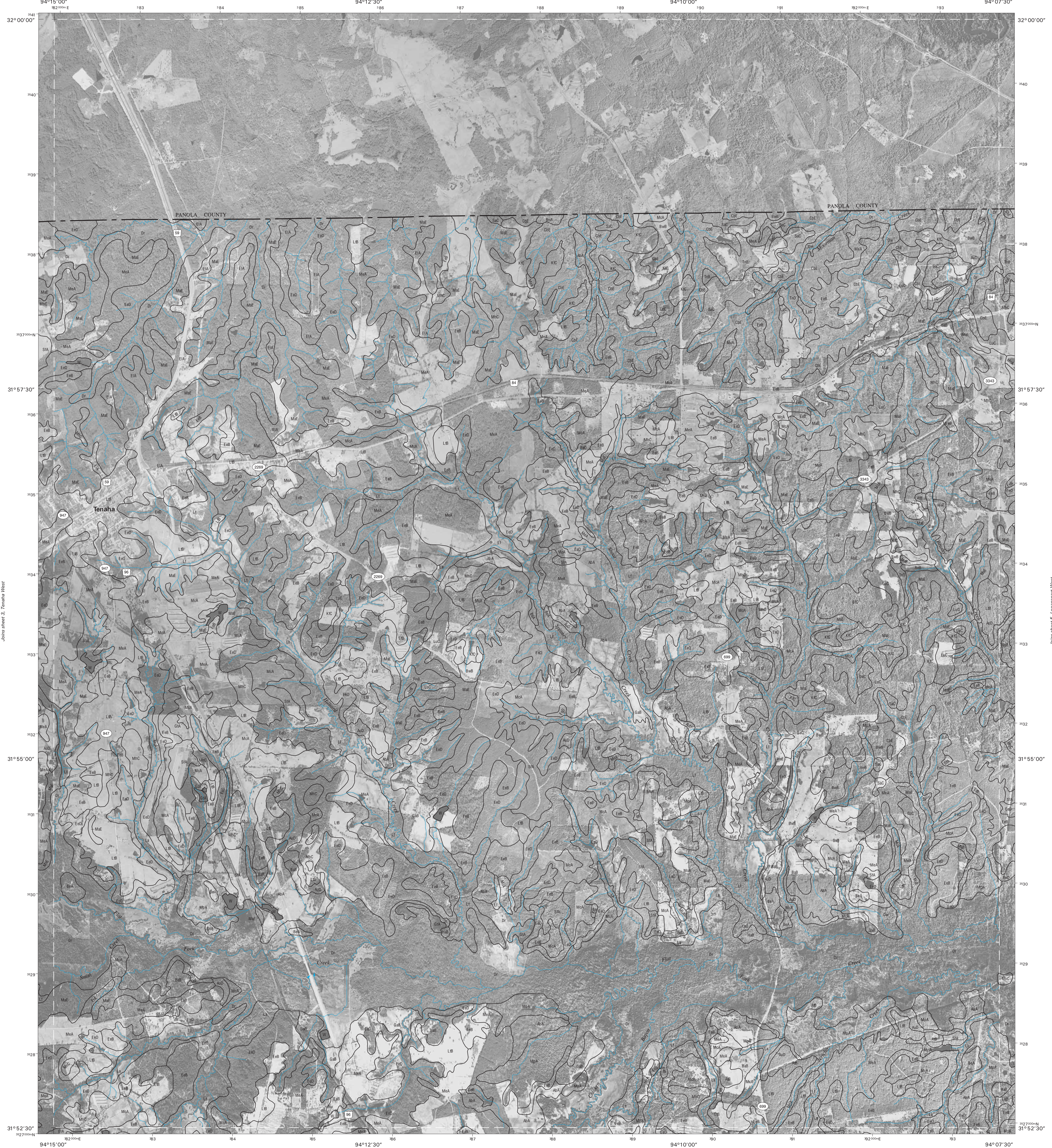


Joins sheet 8, Arcadia

SCALE 1:24000

TENAHA WEST, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 3 OF 21

Soil map delineations extending beyond the dashed white quadrangle neartline are for reference only and are included on adjacent map sheets.



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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

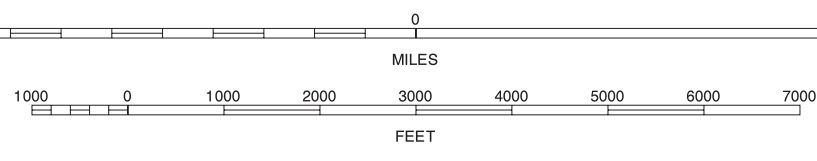
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QUADRANGLE LOCATION

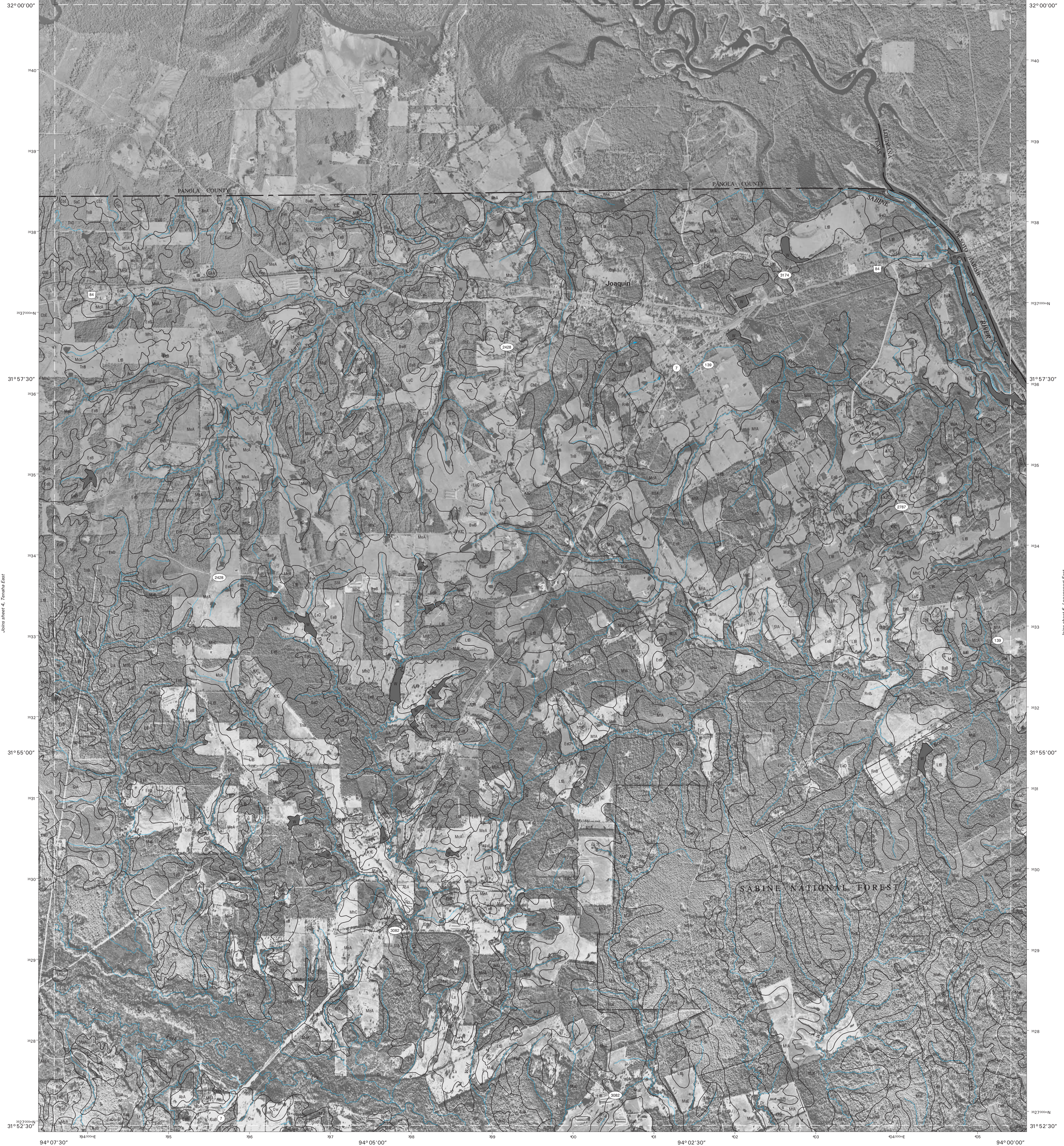
Joins sheet 9, Center

SCALE 1:24000



TENAHA EAST, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 4 OF 21

Soil map delineations extending beyond the dashed white quadrangle neartline are for reference only and are included on adjacent map sheets.



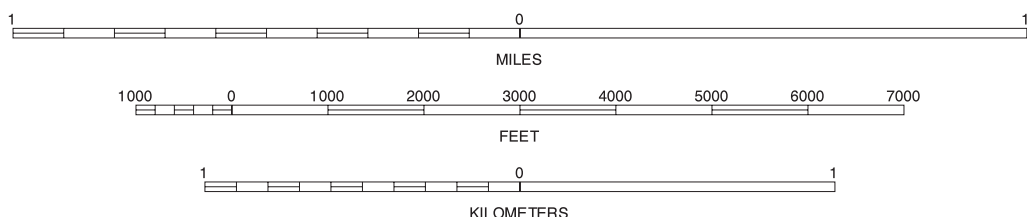
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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION



Joins sheet 10, Shelbyville

SCALE 1:24000

LOGANSPOUT WEST, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 5 OF 21

Soil map delineations extending beyond the dashed white quadrangle neartline are for reference only and are included on adjacent map sheets.

Joins sheet 6, Loganspout East

Joins sheet 9, Center

Joins sheet 11, Huey



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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

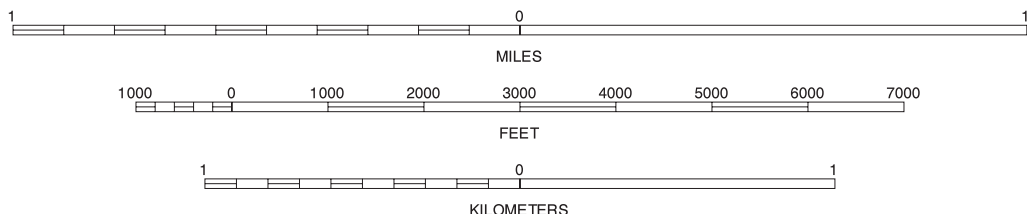
NORTH



QUADRANGLE LOCATION

Joins sheet 11, Huxley

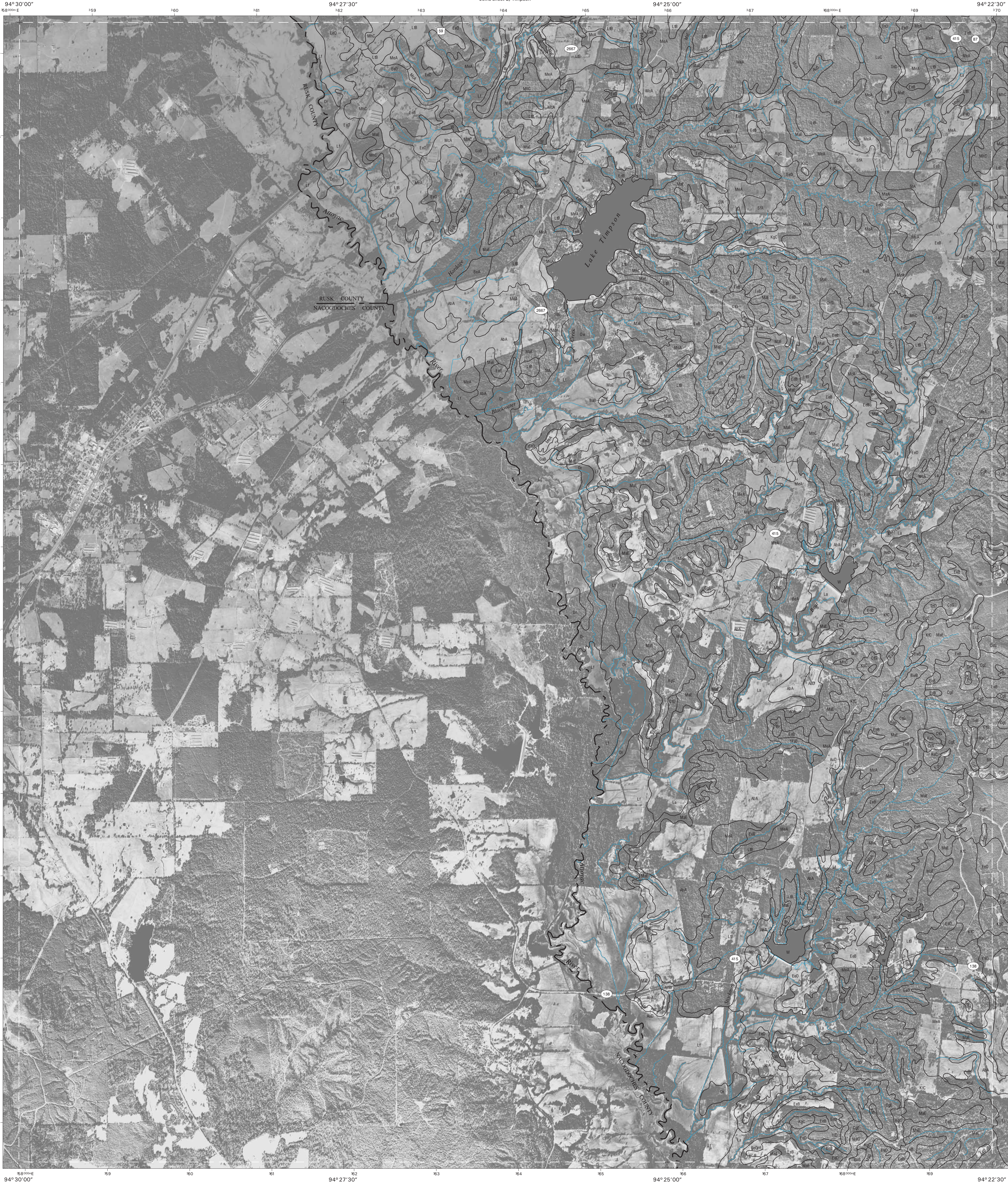
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LOGANSPORT EAST, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 6 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 12, Union Springs



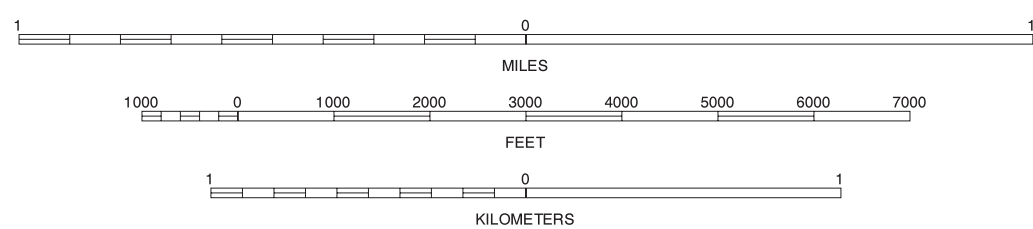
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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION



GARRISON EAST, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 7 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

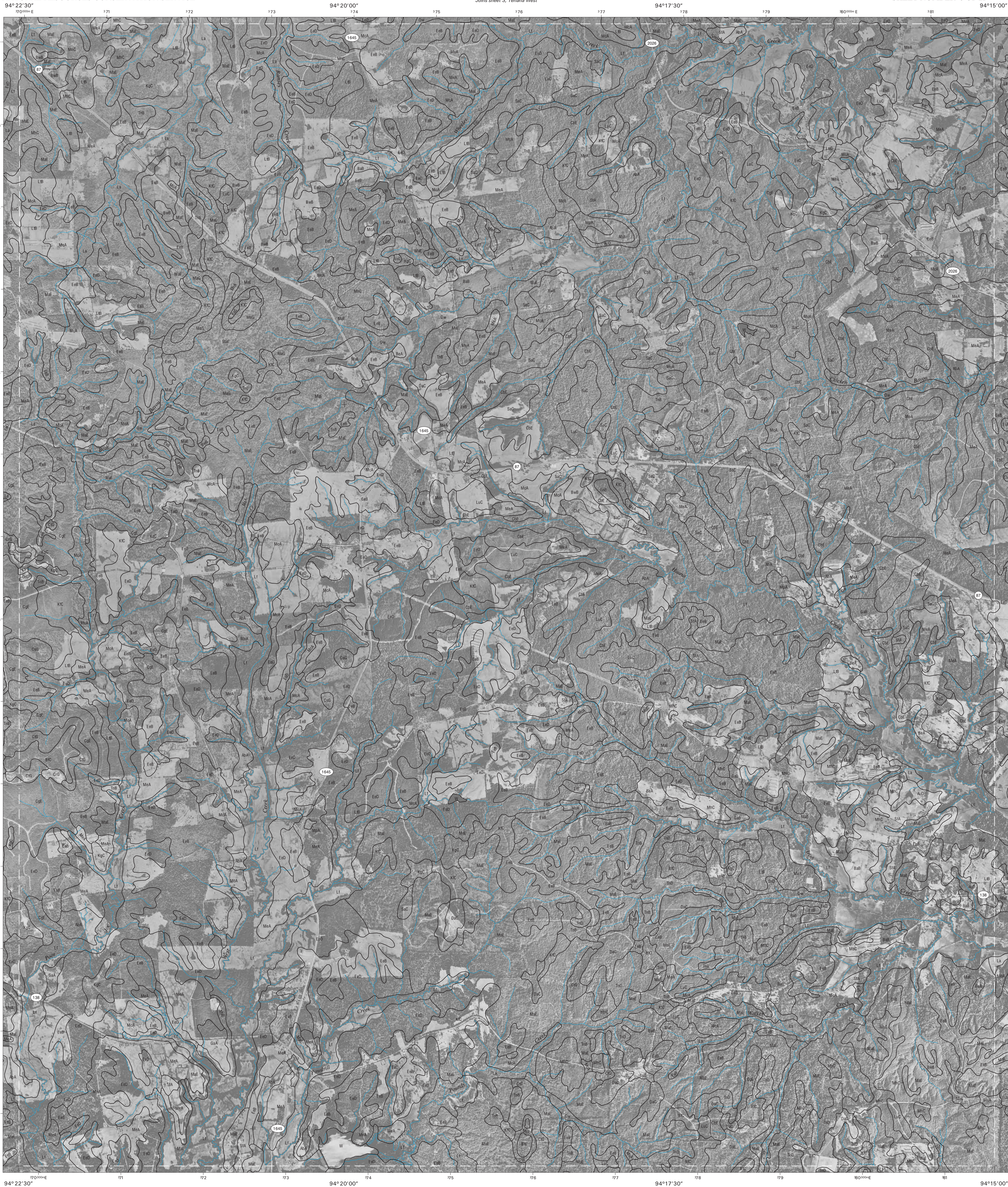
Joins sheet 2,
Timpson

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SHELBY COUNTY, TEXAS
ARCADIA QUADRANGLE
SHEET NUMBER 8 OF 21

Joins sheet 4,
Tenaha East

Joins sheet 3, Tenaha West



Joins sheet 7, Garrison East

Joins sheet 9, Center

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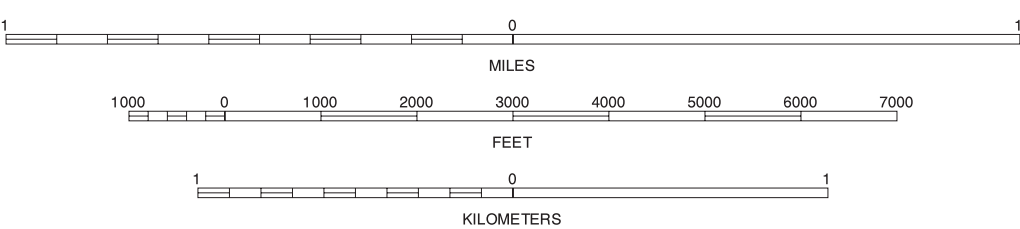
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NORTH



QUADRANGLE LOCATION

SCALE 1:24000

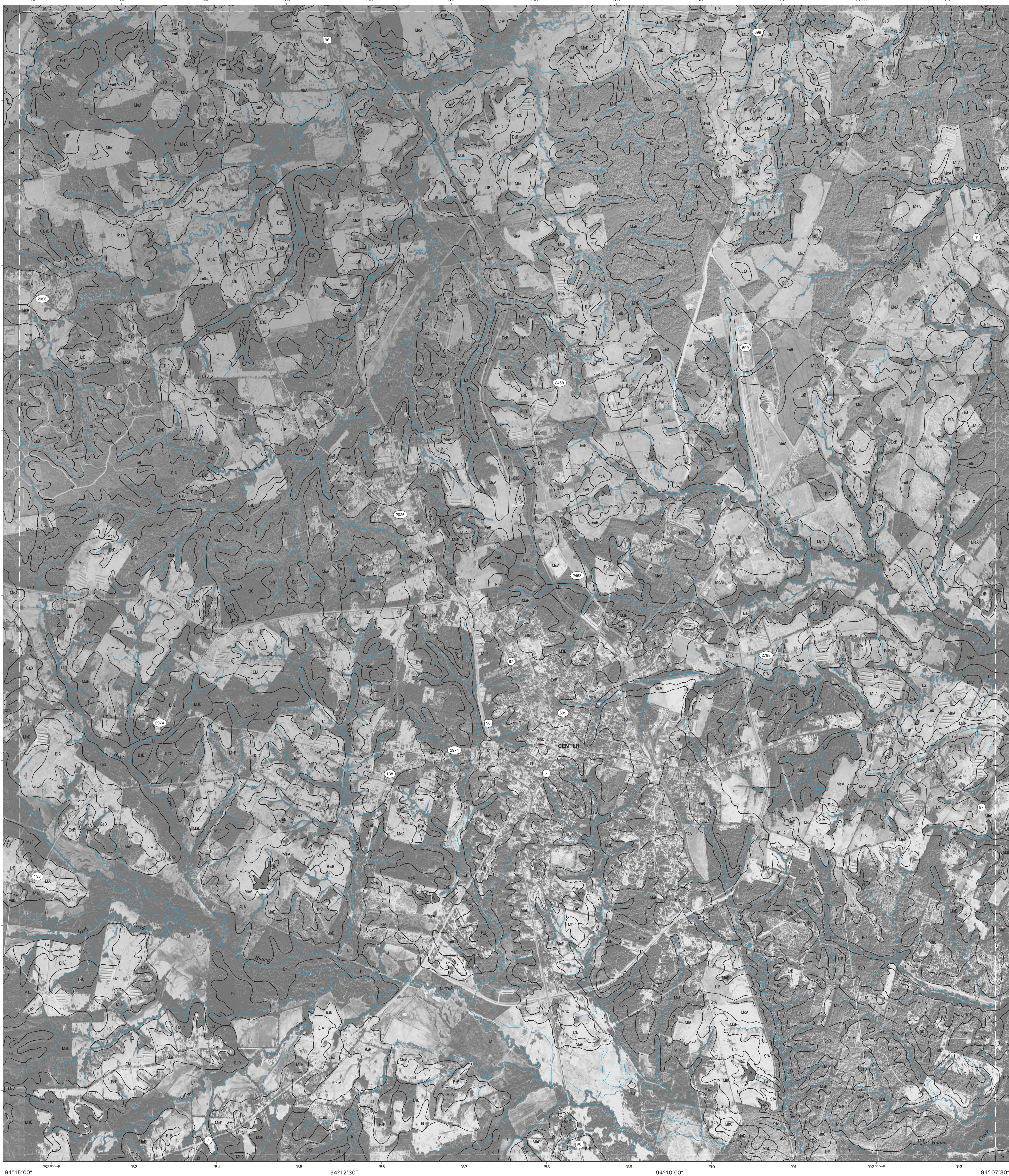


ARCADIA, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 8 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

Joins sheet 13,
Marionville

Joins sheet 15,
Newville (reversed)



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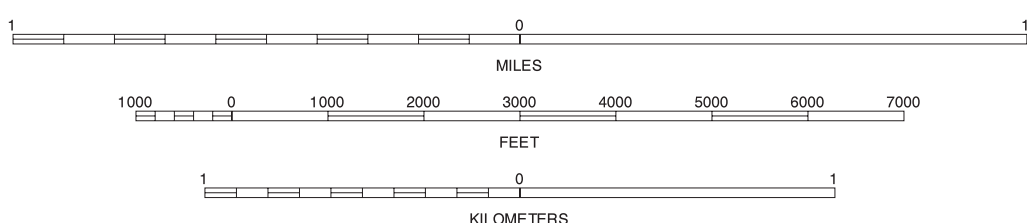
NORTH



QUADRANGLE LOCATION

Joins sheet 15, Neville (oversize)

SCALE 1:24000



CENTER, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 9 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatine are for reference only and are included on adjacent map sheets.

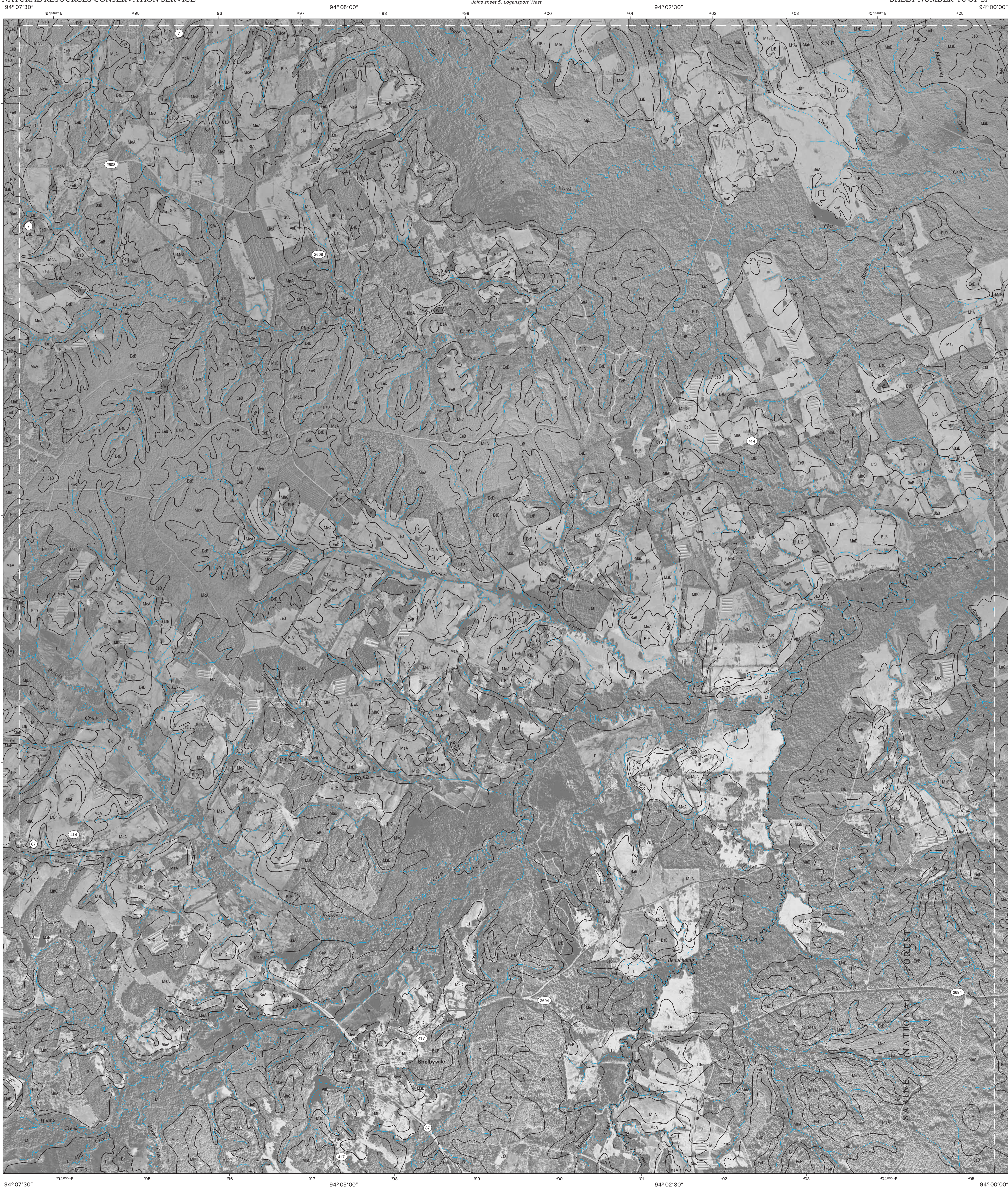
Joins sheet 4,
Tulsa East.

UNITED STATES
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SHELBY COUNTY, TEXAS
SHELBYVILLE QUADRANGLE
SHEET NUMBER 10 OF 21

Joins sheet 6,
Logansport East.

Joins sheet 5, Logansport West



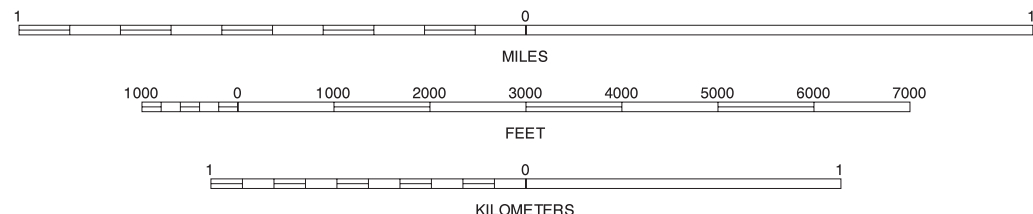
Joins sheet 16, Hursttown

SCALE 1:24000

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUADRANGLE LOCATION



SHELBYVILLE, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 10 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatine are for reference only and are included on adjacent map sheets.

Joins sheet 15,
Meriville (overseal)

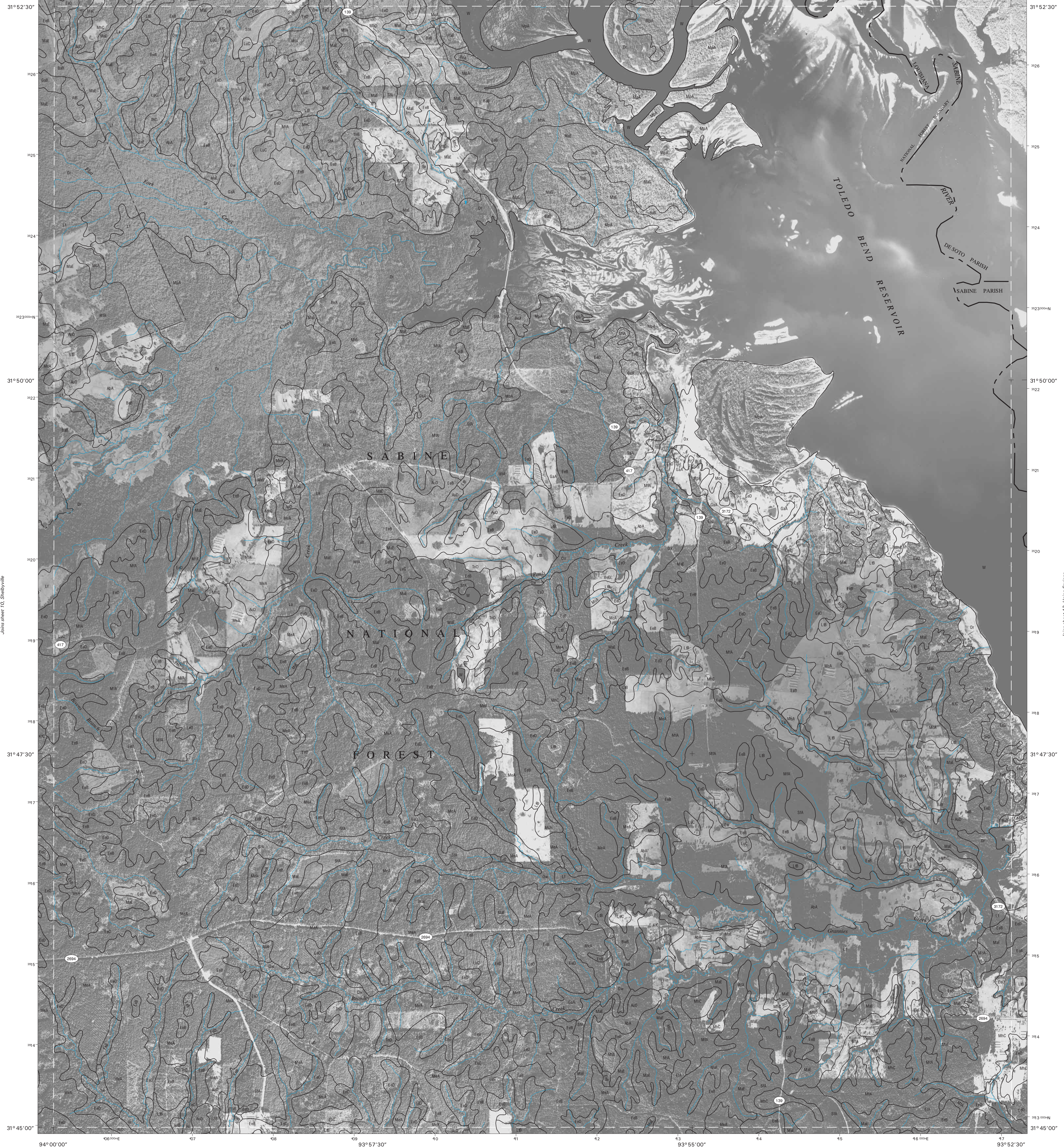
Joins sheet 17,
Pavon North

Joins sheet 5,
Logansport West

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
94° 00' 00" 93° 57' 30" 93° 55' 00" 93° 52' 30"

SHELBY COUNTY, TEXAS
HUXLEY QUADRANGLE
SHEET NUMBER 11 OF 21

Joins sheet 6, Logansport East



Joins sheet 10, Shelbyville

Joins sheet 12, Union Springs

Joins sheet 16,
Hudgson

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

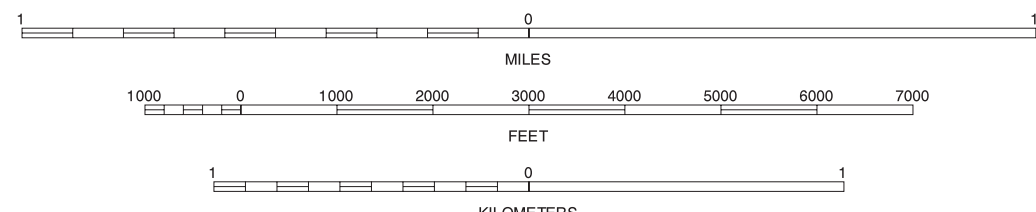
NORTH



QUADRANGLE LOCATION

Joins sheet 17, Patroon North

SCALE 1:24000



HUXLEY, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 11 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatine are for reference only and are included on adjacent map sheets.

Joins sheet 18,
Brushy Creek



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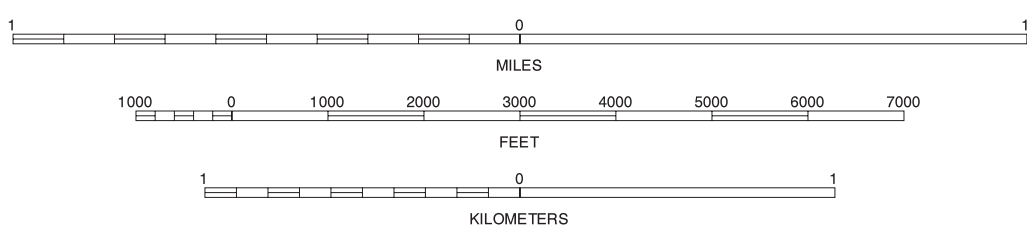
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



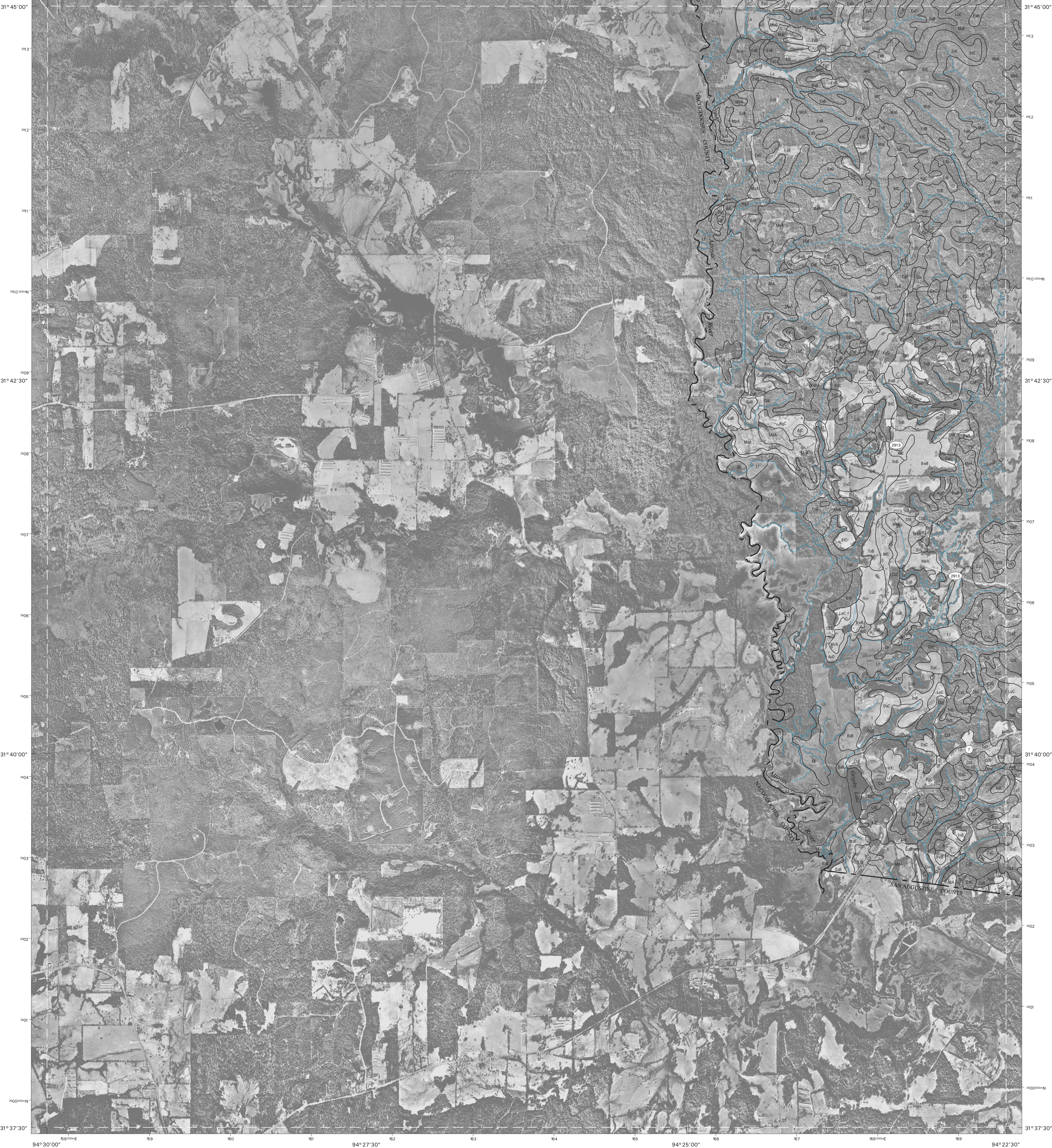
QUADRANGLE LOCATION

SCALE 1:24000



UNION SPRINGS, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 12 OF 21

Soil map delineations extending beyond the dashed white quadrangle neartine are for reference only and are included on adjacent map sheets.



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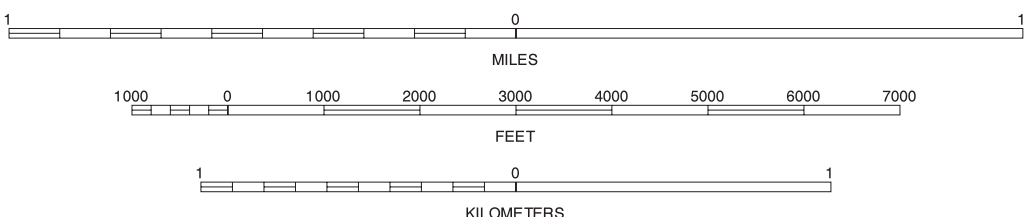
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



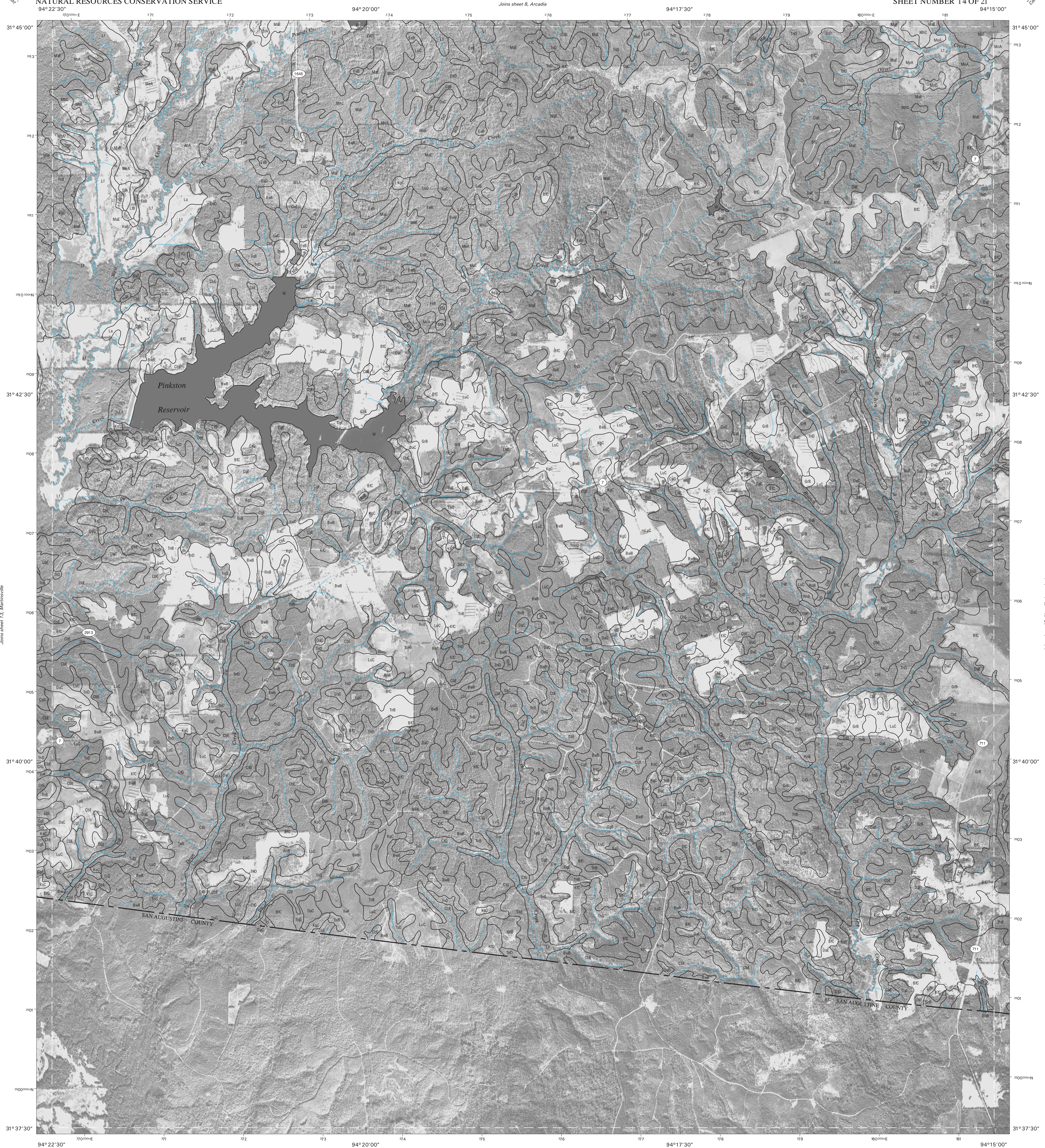
QUADRANGLE LOCATION

SCALE 1:24000



MARTINSVILLE, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 13 OF 21

Soil map delineations extending beyond the dashed white quadrangle nealline are for reference only and are included on adjacent map sheets.



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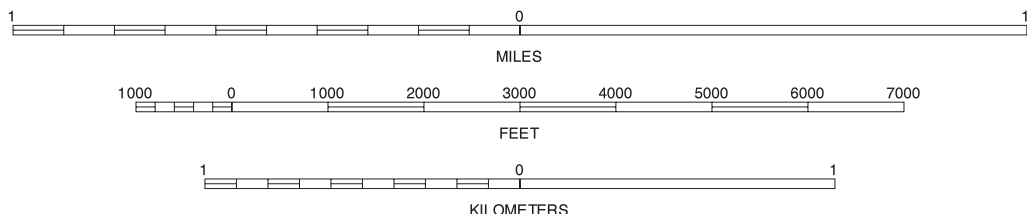
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



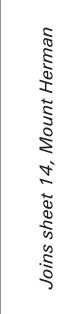
QUADRANGLE LOCATION

SCALE 1:24000



MOUNT HERMAN, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 14 OF 21

Soil map delineations extending beyond the dashed white quadrangle neoline are for reference only and are included on adjacent map sheets.



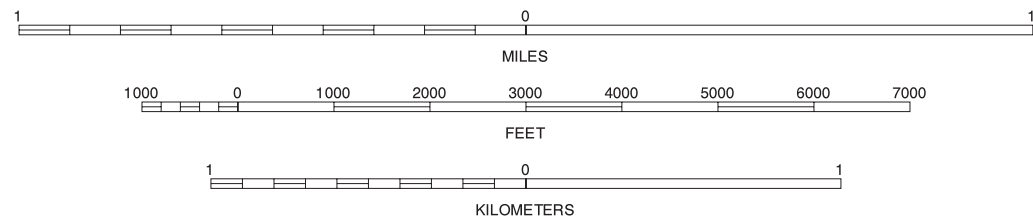
QUADRANGLE LOCATION

The image displays three horizontal number lines, each representing a different unit of length. The top line is labeled 'MILES' and has a scale from 0 to 1, with major tick marks every 1000 miles. The middle line is labeled 'FEET' and has a scale from 0 to 7000, with major tick marks every 1000 feet. The bottom line is labeled 'KILOMETERS' and has a scale from 0 to 1, with major tick marks every 1000 kilometers. The lines are arranged vertically, with the 'MILES' line at the top, the 'FEET' line in the middle, and the 'KILOMETERS' line at the bottom. The 'FEET' line is the longest, followed by the 'MILES' line, and the 'KILOMETERS' line is the shortest.

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.



SCALE 1:24000



HURSTOWN, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 16 OF 21

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North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown,
are approximately positioned. Digital data are available
for this quadrangle.

NORTH



QUADRANGLE LOCATION

bins sheet
patron Sol

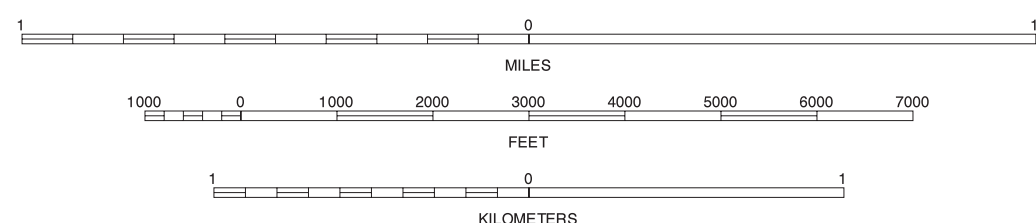
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the Natural Resources Conservation Service from 1995-1998 aerial photography. Hydrography and cultural layers were acquired from U.S. Department of Agriculture, Natural Resources Conservation Service. The hydrography and cultural layers were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

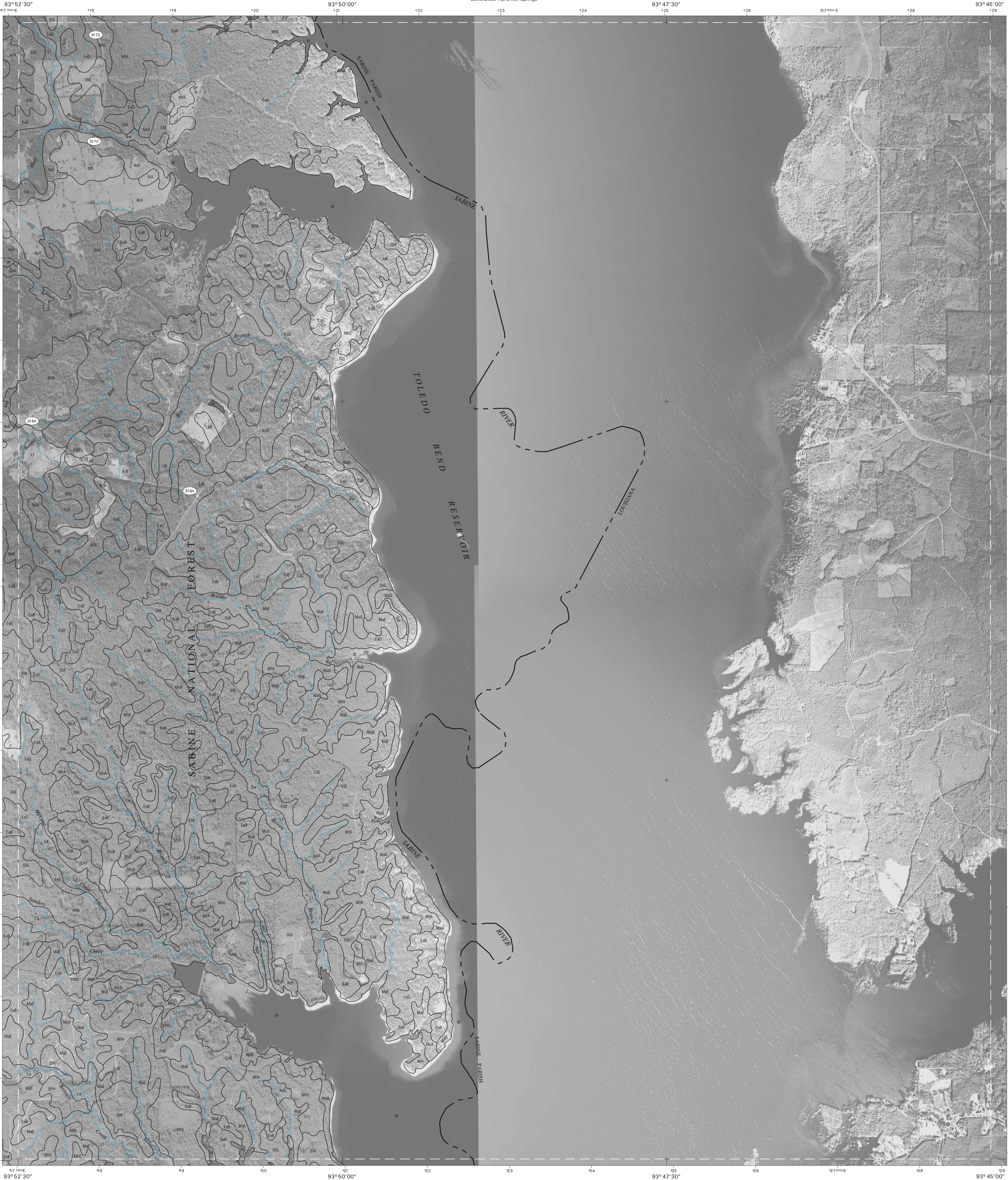
NORTH



QUADRANGLE LOCATION



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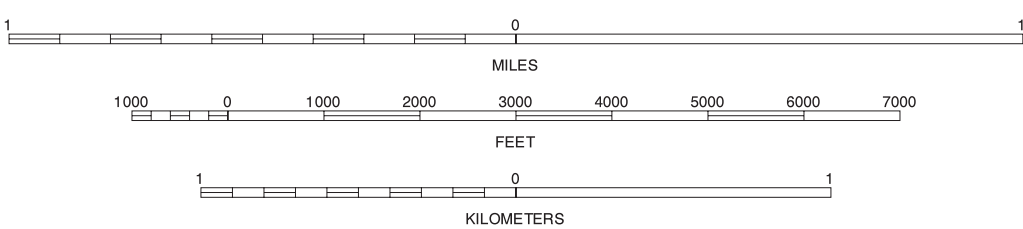
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



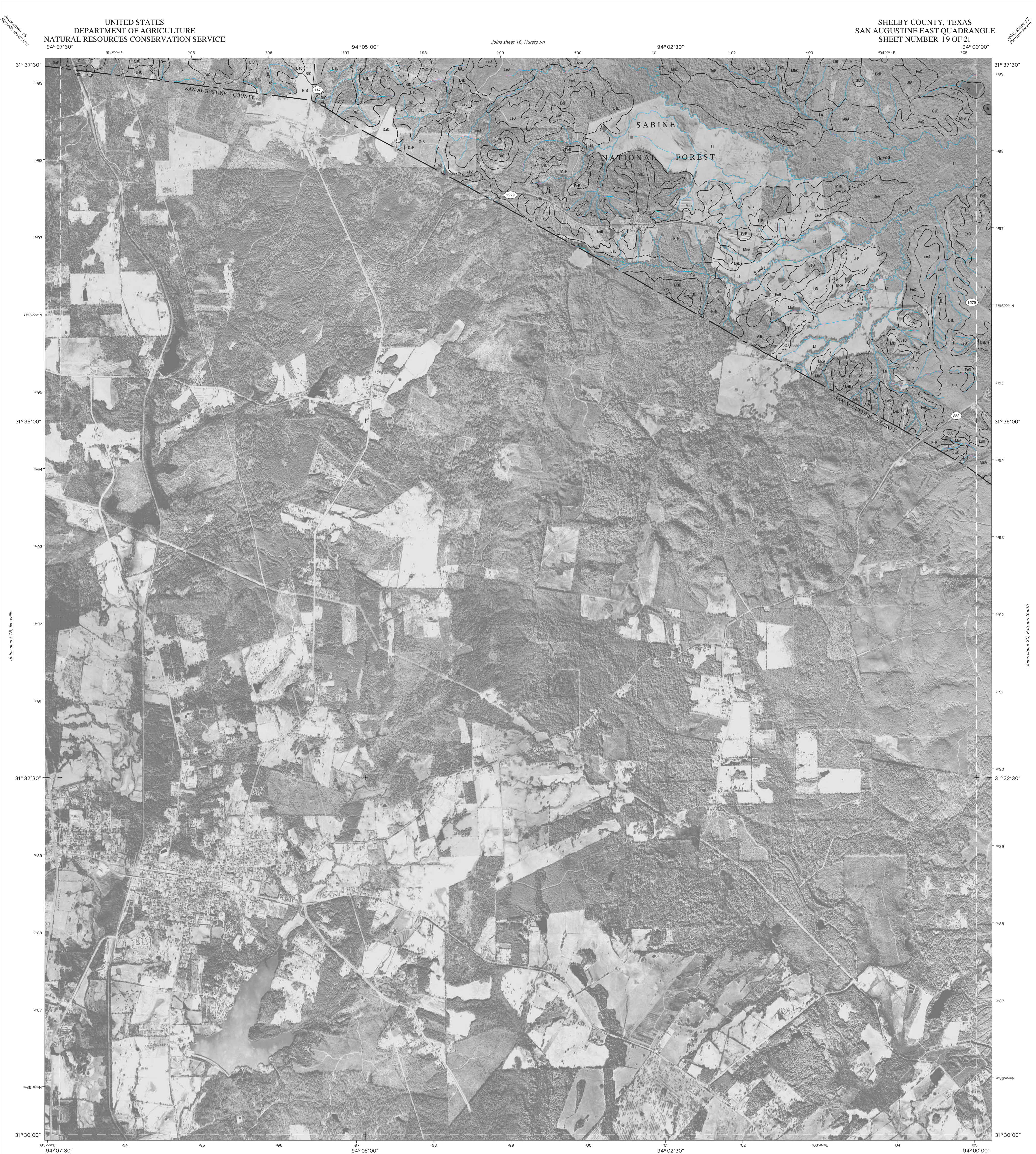
QUADRANGLE LOCATION

SCALE 1:24000



BRUSHY CREEK, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 18 OF 21

Soil map delineations extending beyond the dashed white quadrangle neatlne are for reference only and are included on adjacent map sheets.



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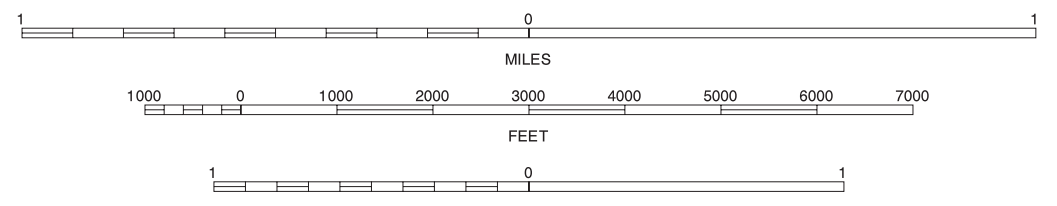
North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION

SCALE 1:24000



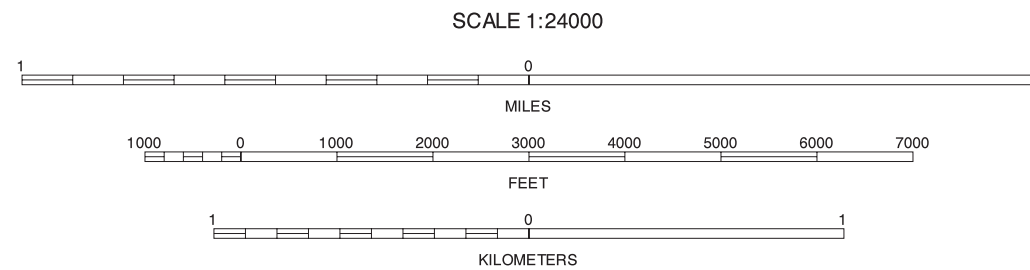
SAN AUGUSTINE EAST, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 19 OF 21

Soil map delineations extending beyond the dashed white quadrangle neoline are for reference only and are included on adjacent map sheets.

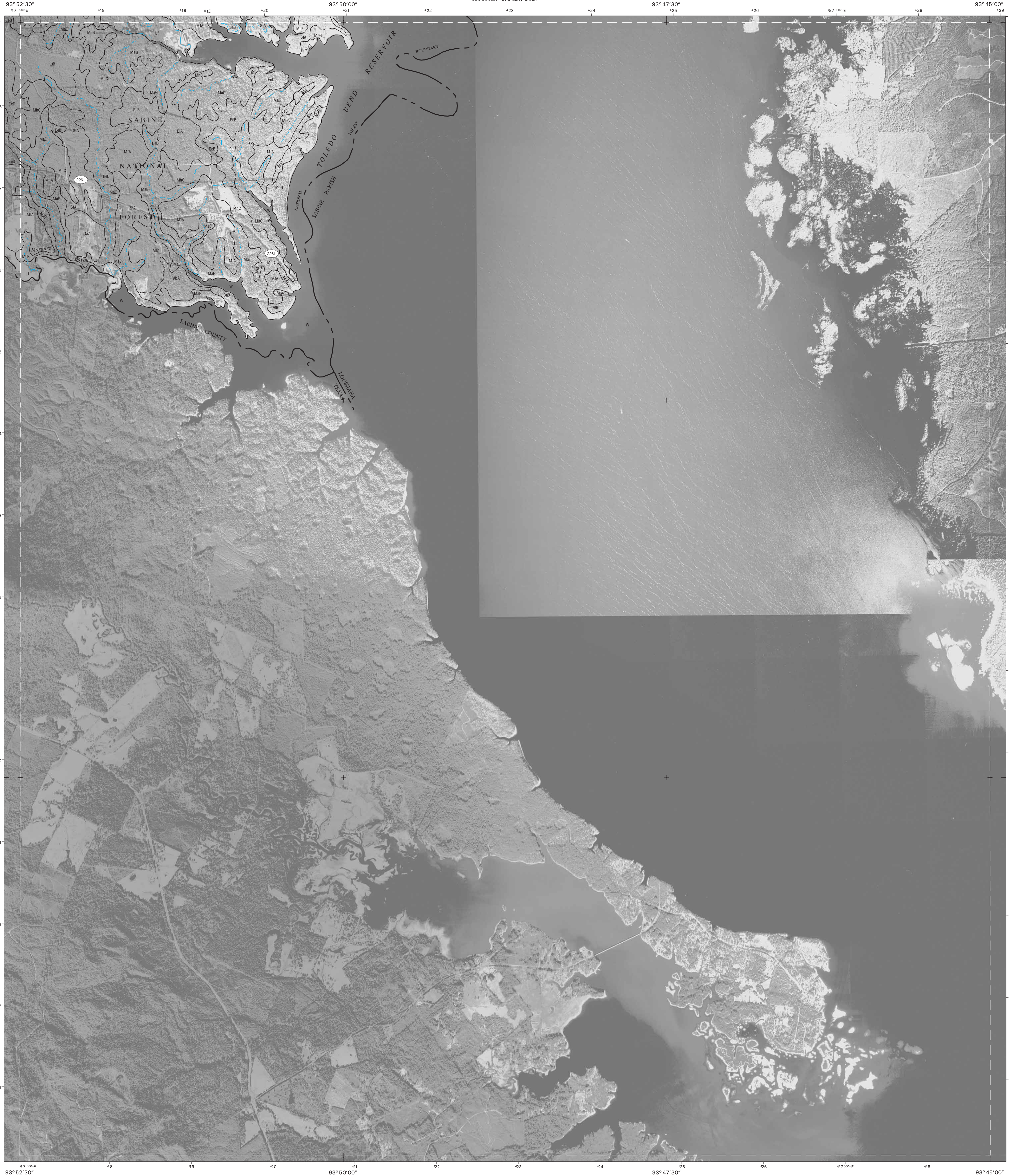
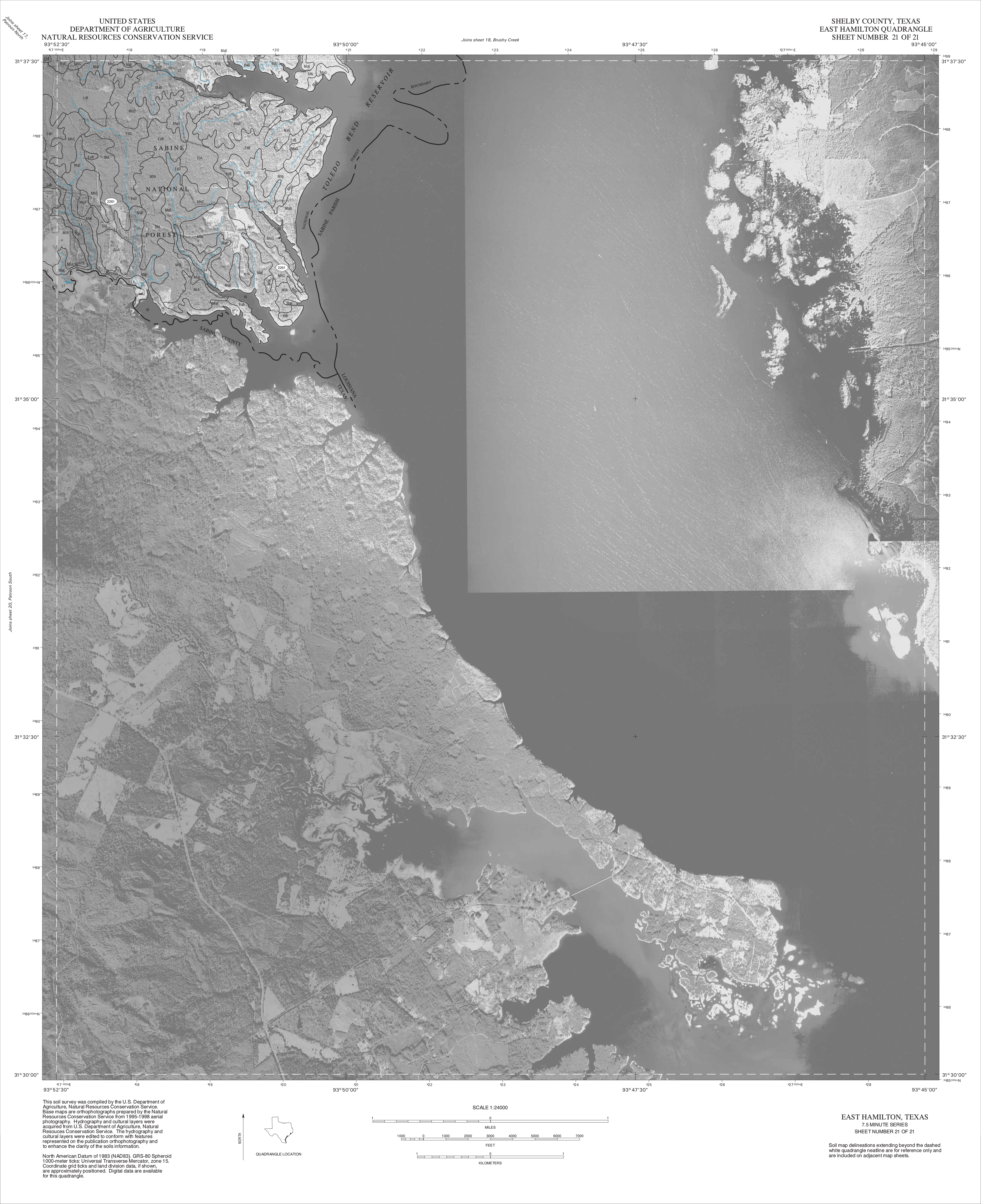
North American Datum of 1983 (NAD83). GRS-80 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 15.
Coordinate grid ticks and land division data, if shown,
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QUADRANGLE LOCATION



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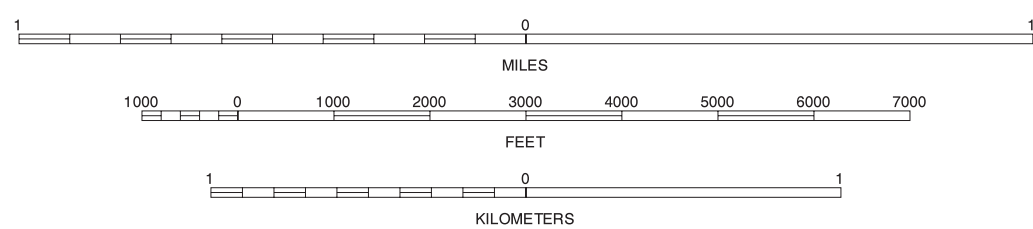
North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks; Universal Transverse Mercator, zone 15. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION

SCALE 1:24000



EAST HAMILTON, TEXAS
7.5 MINUTE SERIES
SHEET NUMBER 21 OF 21

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